

ECONOMIC GEOGRAPHY OF SOUTH AMERICA

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PREFACE

This book has grown out of the writer's course in the Geography of South America given at the University of Wisconsin, and out of a visit in 1924 to parts of Peru, Bolivia, Chile, Argentina, Uruguay, and Brazil.

The subject matter of the book is organized on the basis of countries and of geographical regions. The student of South American geography desires to know something of the South American countries as countries; something about the people, resources, industries, and commerce of each country as a whole. In the world's doings, Chile, Argentina, Peru, Colombia, and the other countries are units. Countries are the geographical regions about which people read, in which they are interested, and with which international affairs deal. Countries as political entities are, in many ways, the most significant of geographical units.

But, within each of the larger countries, and often overlapping national boundaries, are natural regions which are also geographically important. The basins of the Amazon and of the Rio de la Plata, for example, overlap national boundaries; yet these great river basins possess a degree of economic unity which ought to be recognized, and, in the following chapters, is recognized. In most of the South American countries there are distinct natural regions such as the Central Valley of Chile, the Pampa of Argentina, and the Eastern Highland of Brazil, and such natural regions are made special units of study.

The characteristics of the people who have come into possession of South America, and the sort of governments which they maintain, are no less important than the physical character of the regions. In economic geography, the human element is of large significance. Physical and climatic features and natural resources determine, to a degree, what man *may* do in a given region; but many non-geographical factors, primarily man himself, decide what actually shall be done in transforming opportunities into realization.

Obviously the bibliographies at the ends of chapters and at the end of the book are not intended to be exhaustive. They include the more readily accessible primary and secondary sources in English, with additions, mostly from official sources, in Spanish and Portuguese.

For various kinds of assistance, I am indebted to many people both in South America and in the United States. From Dr. Julius Klein, Director of the Bureau of Foreign and Domestic Commerce, I received letters of introduction to United States commercial attachés, trade commissioners and consuls in various South American countries. These officials and their staffs were of very great service, and I desire to acknowledge my obligations to them; they include Mr. Walter N. Pearce, Lima; Mr. Dale C. Macdonough, La Paz; Mr. George A. Makinson, Valparaíso, Mr. Ralph Ackerman, Santiago; Mr. Edward F. Feeley and Mr. George Brady, Buenos Aires; Mr. R. M. Connell, São Paulo; and Mr. W. E. Embry and Mr. M. E. Cremer, Rio de Janeiro. Courtesies were received from the representatives of Grace and Company, and from representatives of the Chile Copper Company, from Señor Rafael Larco Herrera, Lima; Professor D. S. Bullock, Angol, Chile; Señor Ing. Carlos Vallejo, and Señor Alejandro Bunge, Buenos Aires, and Mr. Justus Wallerstein, Rio de Janeiro.

From Professor W. H. Haas of Northwestern University, Professor Preston E. James of the University of Michigan, Mr. E. C. Le Fort and Dr. Glenn Trewartha of the University of Wisconsin, and Dr. Selma Schubring of Madison, I received helpful assistance and suggestions. In the preparation of drawings, Mr. G. H. Smith of the University of Wisconsin and Miss Florence Whitbeck of the University of Rochester rendered valuable service, which it is a pleasure to acknowledge.

R. H. WHITBECK.

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ECONOMIC GEOGRAPHY OF SOUTH AMERICA

CHAPTER I

THE CONTINENT OF SOUTH AMERICA

SIGNIFICANCE OF ITS LOCATION AND PHYSIOGRAPHIC FEATURES

Geographical Influences Underlying the Discovery and Colonization of South America by Spain and Portugal.—When the Turks took Constantinople in 1453 and closed the accustomed trade routes between south Europe and the East, an impelling reason was created for some one to undertake a voyage westward across the Atlantic in search of a sea route to the Orient. The Mediterranean peoples were the first to suffer from the closing of the eastern trade routes to India, and the first to suffer are likely to be the first to bestir themselves to find a remedy. It was logical that a Venetian or a Genoese—representing the foremost of trading peoples of the period—should be the first to seek a new route to the East. It was equally logical that Columbus, a Genoese, should find a sympathetic hearing in Spain, a land where geographical location on the extreme western margin of Europe and at the western gate of the Mediterranean made it a convenient and natural place of departure.

Another geographical factor influenced the course which the little fleet commanded by Columbus should follow, namely, the position of the northern belt of trade winds and the direction in which they blow. These winds blow steadily toward the southwest, and they carried the sailing ships of Columbus across the Atlantic well to the south of the latitude of Spain. The first land encountered was in the West Indies, in latitude 24°N. The trade winds in a measure determined that the Spanish colonial empire in the New World should begin in Middle America, whither the early exploring ships carried their explorers, and then should spread out toward the north and south. The direction of these winds in an age of sailing vessels determined that

the ships sailing from Spain and Portugal to the New World should sail in the tropics and not in the more northerly belt of westerlies with their buffeting winds adverse to westward voyages

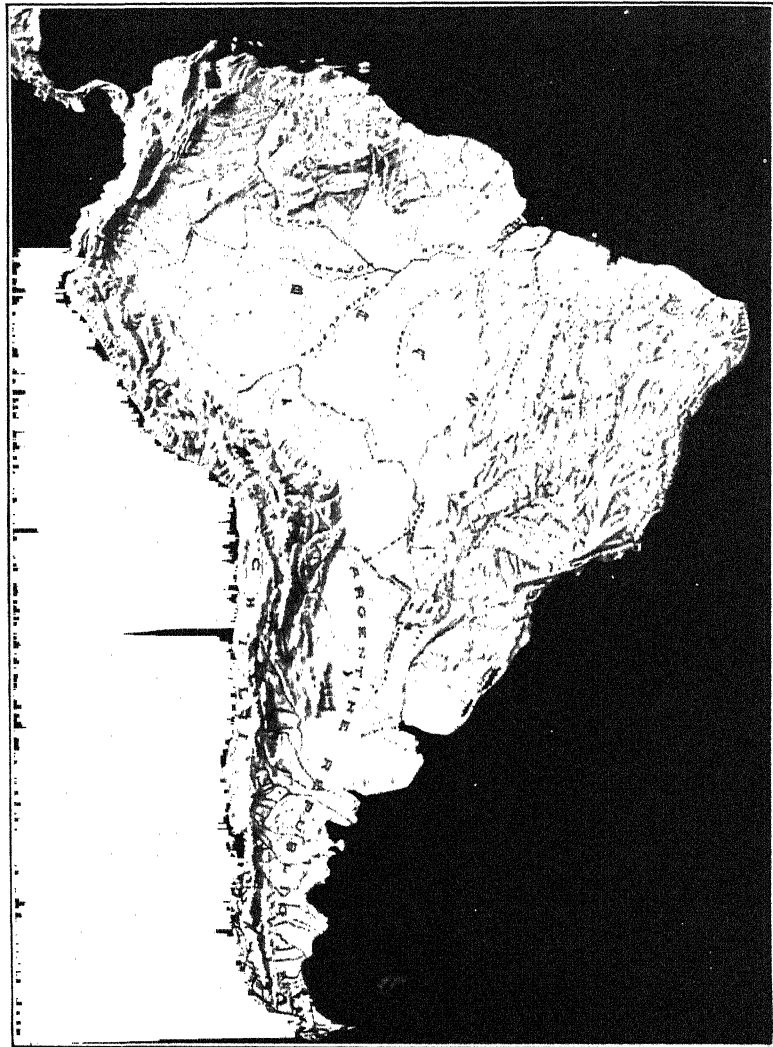


FIG. 1.—Relief map of South America. *Photographic reproduction of Howell's model, copyrighted by the Macmillan Co. (Reprinted by Permission.)*

from Europe. Thus it came about that Spain's approach to her future American possessions lay in the path of the trades

through West Indian waters to Mexico and the Isthmus of Panama.

In a measure, the trade winds were responsible for the independent discovery of the eastern mainland of South America by the Portuguese, and the later control of Brazil by that nation. In 1500, Portuguese ships under the command of Pedro Alvares Cabral, while sailing southward on a voyage around Africa, were carried westward by the southeast trade winds and touched the eastern coast of South America, and their commander laid claim to the territory in the name of the king of Portugal.

Thus did a series of geographical circumstances influence historical events so that South America and southern North America became Spanish and Portuguese, while other circumstances were leading to British domination of the eastern coast of North America and later made most of that continent essentially Anglo-Saxon in its type of civilization. One cannot help speculating what might have been the results if South America had fallen to the Anglo-Saxons and North America to the Spanish and Portuguese. And this raises the old question of the *importance of geographical influences* in shaping the course of history.

Significance of the Location of the Continent of South America.

The strong and advanced nations of the world, for some reason, have always been those of the north temperate (north intermediate) zone, which includes very nearly all of Europe, Asia, and North America. Modern civilization has grown up in this zone, especially in Europe. The great colonizing and trading nations have been European. The peoples who occupied and initiated the development of the Americas, Africa, Australia, and the islands of the sea went out from Europe; and these newer lands were long joined to Europe by political ties, and some of them are still so joined. All are united to Europe by ties of race, language, culture, and commerce. During the last quarter of the eighteenth century and the first quarter of the nineteenth, nearly all of the European colonies in the Americas broke away from their mother countries and set up independent governments. Prior to this separation, the geographical location of South America was deemed little, if any, less favorable than that of North America. Spain and Portugal maintained close relations with their American colonies, and the fact that some of them were a long way off did not prevent the mother countries from actively participating in their economic life. In short, so long

as political ties bound the South American colonies to Europe, their out-of-the-way location was little felt. But when these colonies separated from the mother countries, and the latter ceased to participate actively in their development, then the location of South America in the southern hemisphere gradually revealed itself as something of a disadvantage. Distance is always a factor to be reckoned with. Moreover, the loss of their American colonies hastened the decline of Spain and Portugal to unimportant places in world affairs; and they were unable, in other parts of the world, to make good their losses, as Great Britain did. Severed from their mother countries and too weak

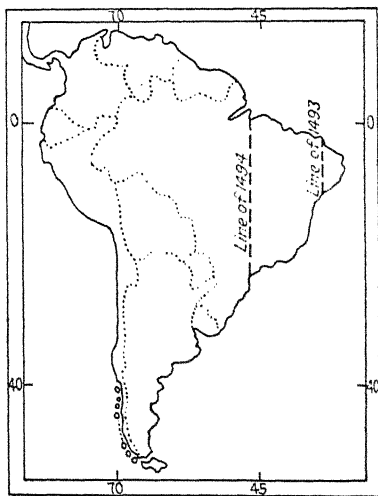


FIG. 2.—The two lines of demarcation originally intended to separate the colonizing activities of Spain and Portugal in the New World.

and inexperienced in self-government to do much for themselves, the South American countries suffered, among other handicaps, the full disadvantage of their location off the great east-west routes along which the currents of commerce, emigration, and development have flowed most freely. These currents are strongest in the northern hemisphere where the great land masses, with their invigorating cyclonic climate, have brought forth numerous and vigorous peoples. It would be easy, however, to emphasize unduly this out-of-the-way location of most of South America. While it unquestionably

has somewhat retarded the development of the continent, it has been a minor rather than a major influence. It is the influence that the location of South America exerts upon its *climate*, rather than its out-of-the-way commercial location, that merits emphasis.

The Isolation of the West Coast.—Soon after the discovery of America, Spain and Portugal accepted a division of their spheres of activity in the New World, and the Pope established a Line of Demarcation, which gave eastern South America to Portugal

and the western portion to Spain (Fig. 2). However, the actual landing of Cabral in eastern South America, already referred to, gave Portugal her real claim to this part of the continent, and forced the Spanish conquerors to devote themselves mainly to the northern and western portions of South America. But the land barrier formed by the Isthmus of Panama prevented the Spanish fleets from directly reaching the west coast, and compelled the laborious transfer of cargoes across the isthmus by men and animals. So long as Spain held her vast colonial possessions in America and maintained regular connection with them by her fleets and galleons, even the west coast of South America felt no serious handicap because of its geographical isolation. But after the colonies broke away from Spain and set up independent governments, this isolation became, for a century, a seriously retarding influence upon European immigration to these lands and a hindrance to their commerce. True, ships from Europe rounded Cape Horn and reached the ports of the west coast, but it was a long trip. The southerly location of Chile and its rich nitrate deposits gave that country frequent steamship connections with Europe and eastern North America and broke down its geographical isolation in a degree; but for the other west coast countries, that isolation continued until the opening of the Panama Canal in 1914.

Framework and Dimensions of the Continent.—The shape of any continent is due largely to the distribution of the mountain systems which make up its framework. This continental framework usually consists of a major mountain system and one or more minor mountain systems. If the major axis extends north and south, the long dimension of the continent is north-south, as it is in both North America and South America. If the main axis extends east and west, as it does in Eurasia, then the long dimension of the continent is east-west. The width of a continent in its various parts is determined mainly by the distance between the principal mountain systems that constitute its framework. In South America, the major axis is the Andes system in the west, and the secondary axis is the highland of eastern Brazil (Fig. 1). These two axes converge toward the south. In fact, the Brazilian or minor axis becomes progressively lower toward the south and disappears under the plains of the River Plate, leaving only the Andes to continue 25 degrees farther to the south, tapering to a point at Cape Horn.

South America is broad in its northern portion because there the mountain systems are far apart. It is somewhat narrower in the extreme north because there the Guiana highland, the



FIG. 3.—Plains of South America below 1,000 feet in elevation (black). (*After Goode.*)

third element of the continental framework, is not so far from the Andes as the Brazilian highland is. The continent is very

narrow in the south because into this portion only the single major axis extends. Between these three mountain systems—the Andes, the Brazilian highlands, and the Guiana highlands—are the vast plains, built up mainly of the sediments which ages of weathering and erosion have removed from the elevated lands and deposited in the shallow seas between, and which have later been moderately uplifted into plains. It happens, in the case of South America, that the extent of *coastal* plains is small, while that of *interior* plains is large (Fig. 3). In fact, there is only an extremely narrow coastal plain along the entire western side of the continent, and only a narrow strip along the coast of Brazil until the Amazon basin is approached. The absence of broad, easily occupied coastal lowlands in South America has been a retarding influence in the conquest of the continent. In contrast, the presence of a broad plain on the eastern coast of North America greatly aided the early development of that continent.

South America has a length of approximately 4,500 miles, a width of about 3,000 miles in the widest part, and an area not accurately known, but computed at slightly more than 7 million square miles, or 80 per cent of that of North America. It is a continent of emphatic contrasts in topography, with an exceptionally large proportion of lowland; 40 per cent of the area is less than 600 feet in elevation, and about 65 per cent is below 1,000 feet. On the other hand, 6 per cent of the area is about 10,000 feet in elevation (Fig. 1). It is probably true of South America, as of no other continent, that its highlands are of more significance to the people than are the lowlands. About three-fourths of South America lies within the tropics, and in most of that great area, the people choose to live in the highlands to escape the tropical heat. Were it not for the highlands, the greater part of the continent would be like the present Amazon jungle. In the United States, over three-fourths of the people live on plains less than 1,000 feet in elevation, while in South America only one-third so live. The only plains of importance that lie in middle latitudes in South America are those of the River Plate (Argentina and Uruguay) and the Central Valley of Chile. Since the economic activities in which men engage are pursued more easily on the plains than in the mountains or on the plateaus, it follows that a continent where men must go to the highlands to escape the enervating climate is unfavorable to these economic activities.

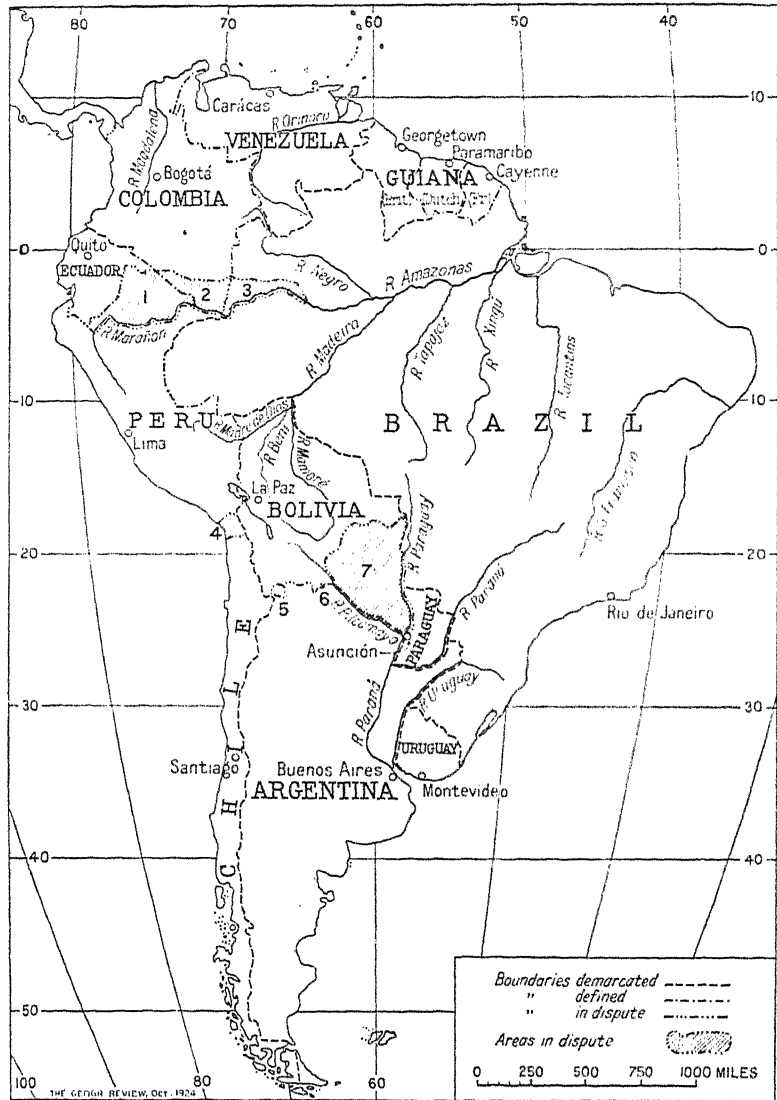


FIG. 4.—Areas still in dispute among South American countries. (Courtesy of Raye E. Platt and the Geographical Review, published by the American Geographical Society of New York.)

THE ANDES MOUNTAINS

Effect of the Location of the Andes upon the Rivers of the Continent.—The Andine chain forms the Great Divide of South America, and from it rivers flow to the Atlantic and to the Pacific. In no other continent is the main water parting so unsymmetrically placed. Not one river of any size in all South America flows into the Pacific. The west-flowing streams are scarcely larger than creeks. Practically none of them are of any use for navigation, and few are large enough or steady enough to be harnessed for power, except in the southern half of Chile. Rivers and river valleys are nature's avenues into the continents, but no such gateways or avenues lead into South America from the west.

The great rivers all flow to the Atlantic. The headwaters of the Amazon rise within 100 miles of the Pacific, but discharge at the opposite side of the continent, nearly 3,000 miles away. Practically all of the rubber that was gathered in Peru and Bolivia found its way to market by way of the Amazon. So far to one side of the continent is the main divide that the Amazon has the largest drainage basin of any river in the world; and Brazil, which controls the mouth of this great river, has been able to gain control of most of its vast basin. Such parts of the Amazon basin as are controlled by the Andine countries are of little use to them and remain almost unused.

A Formidable Barrier.—Nowhere else is there a mountain system of such length, continuity, and altitude as the Andes. This stupendous barrier, rising almost out of the Pacific, is from 100 to 400 miles broad, and for 3,500 miles has few passes as low even as 12,000 feet. In the extreme south, the passes are lower, but even these are thousands of feet in elevation. Nor is this massive system made up of a single range, but usually of several ranges (Fig. 1) often complexly knotted and, near the middle, expanded into the loftiest plateau of the world, excepting only the great plateau of Tibet in Asia. From Cape Horn to central Chile, there is a main mountain range while a minor range extends along the coast, and, in the south where a pronounced sinking of the land has occurred, this coast range becomes a chain of islands. Between the major and minor ranges lies the beautiful and fertile Valley of Chile, which in the south dips beneath the ocean.

The coastal chain of hills and low mountains extends near the entire length of the continent, but it is rarely a formidable barrier, though the barren slopes and summits give the west coast an inhospitable aspect all the way from southern Ecuador to Valparaiso, a distance of nearly 2,500 miles.

The middle and northern Andes consist in places of three complex ranges, but more commonly of two. Between these

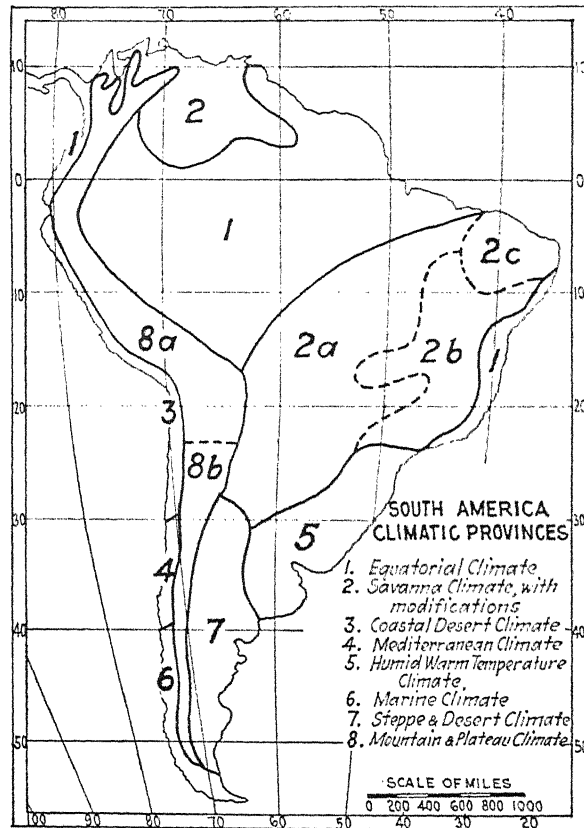


FIG. 5.—Climatic provinces of South America. (G. T. Trewartha.)

are great intermontane valleys, plateaus, detached mountain groups, volcanic peaks, saline basins, and at least two large lakes; the largest, Lake Titicaca, lies at an altitude of 12,500 feet and has an area of 3,200 square miles. Throughout the greater part of their length, the Andes are surmounted by a chain of towering volcanic peaks, both active and quiescent,

for intense volcanic activity has attended the growth of this huge mountain system. A number of the volcanic cones rise to altitudes of nearly 4 miles, and in many places the lowest passes through the ranges are in the neighborhood of 15,000 feet high—higher than the summit of Pike's Peak or any other in the United States (not including Alaska). The highest peaks are perpetually snow capped even within the tropics, and one may see hot vapors rising from a volcanic vent which is shrouded in snow.



FIG. 6.—Types of people seen in the Andes. The famous Sunday market at Huancayo, Peru. (Copyright Ewing Galloway, N. Y.)

So formidable is the Andine barrier that only one railway completely crosses it, and that is accomplished well to the south where it is narrow and provides a pass as low as 10,452 feet in elevation. The few railroads that cross one or more of the main ranges do so at elevations ranging from 10,452 to 15,665 feet. The loftiest railroads which man has attempted anywhere in the world are those of the Andes. On no other continent does a wall of mountains so high and so defiant lift itself almost from the ocean's edge and challenge man to conquer it if he can. Had these mountains not been rich in minerals, it is doubtful if the

white man would even yet have seriously attempted the conquest of the more rugged portions. There is a vast extent of fertile land which lies beyond the Andes (east) in Colombia, Peru, Bolivia, and Brazil, and at no really great distance from the Pacific, but it is barely explored and lies mainly unclaimed and unused. This region is 2,000 miles or more from the Atlantic, and the barrier of the Andes renders the cost of transportation to the Pacific almost prohibitive. The result is that now, after nearly four centuries of white occupation of these mountains, the Atlantic slope has been but slightly touched by Europeans.

Difficulties of Transportation.—The use of railways and of steam locomotives dates back over a hundred years; yet, as already mentioned, only one railway has been built entirely across the Andine system.¹ In North America, 10 trunk lines cross the full width of the western cordillera, which averages much wider than the Andine system, but is less abrupt and less lofty. For example, the Great Northern Railroad crosses the Cascade range at about 3,000 feet elevation and the continental divide at about 5,000 feet. The Central-Union Pacific crosses the Sierra Nevada range at 7,000 feet and the continental divide at 8,000 feet. Contrast these figures with the altitudes at which railroads cross ranges of the Andes:

Guayaquil and Quito Railroad, Ecuador.....	11,841 feet
Central Railroad of Peru.....	15,665 feet
Southern Railroad of Peru.....	14,688 feet
Arica-La Paz Railroad in Chile and Bolivia.....	13,986 feet
Antofagasta and Bolivia Railroad.....	13,000 feet
Chile-Argentine Transandine Railroad.....	10,452 feet

The last-mentioned road cost upwards of \$300,000 a mile, is very expensive to maintain, and is operated at a loss in spite of high rates. On certain of the Andine lines, the grades are so steep that trains can ascend and descend only by a special cog-wheel device—the rack and pinion. The Central Railroad of Peru employs 16 switchbacks in a difficult portion of its route, and in places, five railway tracks, one above the other, are in sight at one time. On most of these lines, the trains go one way on certain days of the week and back on alternate days. Where roads are so costly to build, maintain, and operate, freight rates must be high, which in turn hinders the use of the railroads

¹By completing rail connections between Argentina and Bolivia in 1925, a second railway route from the Atlantic to the Pacific was established.

and restricts their earnings. The generally low earnings of these roads discourages capital from going into other similar enterprises, and thus the railway conquest of the Andes proceeds very slowly.

The central route from Lima to the city of Iquitos, the chief rubber-collecting center on the Amazon in Peru, well illustrates the conditions of travel in the Peruvian Andes. From Lima to Oroya, one travels by railroad one day and crosses the main range of the Andes at an elevation of 15,665 feet. He then may travel by automobile one day over the eastern range. Then follow eight relays of pack mules along narrow trails, occupying 8 days; and then 7 days on the river in canoes and on a small steamer. This journey of 1,200 miles requires 22 to 24 hard days and involves about a dozen changes. Yet this is along a main, established route over which a great deal of travel takes place.

Very little that is produced in eastern Peru or Bolivia is sent to the distant Atlantic or to the much nearer Pacific, for, in the case of most products, the cost of transportation exceeds the value of the articles. Rubber has been the chief product of this isolated region, but the price of rubber has made even this traffic unprofitable.¹ Examples need not be multiplied to impress the fact that a mountain barrier of such magnitude as the Andes, rising along the entire coast of a continent, must retard the whole economic development of that side of the continent.

Climatic Influences of the Andine Cordillera.—From Venezuela southward through Colombia, Ecuador, Peru, Bolivia, and into northern Chile, the Andine system lies within the tropics. Its varying elevations give varying temperatures; those between 4,000 and 9,000 feet are mild or cool, and at these altitudes the greater part of the people (north of Chile) make their homes. Because of the cooling influence of the Humboldt current the irrigated coastal valleys of Peru are only mildly hot. At certain altitudes, the temperature is that of perpetual spring, for each 330 feet of ascent reduces the temperature 1°F. The change of temperature from day to night is usually greater than the seasonal change. In Venezuela, Colombia, and Ecuador, the rainfall on the mountains is heavy, for this region is in the equatorial rain belt a large part of the year. Farther south, the

¹ The rise in rubber prices which came in 1925 may partially revive this traffic.

rainfall is progressively lighter except on the eastern slope of the mountains, and much of the highland in these countries is dry or even desert (Fig. 7). This is due to the fact that the

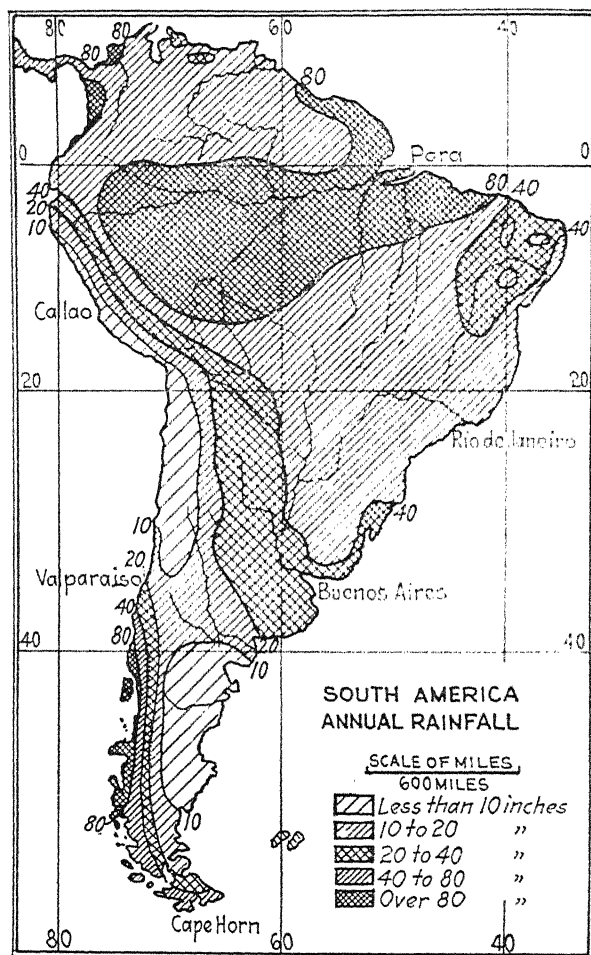


FIG. 7.—Rainfall map of South America. (*Hann-Süring Lehrbuch der Meteorologie*, 4th Ed., 1925.)

region lies in part in the belt of southeast trade winds which precipitate their moisture on the eastern (windward) side of the Andes,¹ and in part in the belt of horse latitudes where the

¹ For detailed treatment of this subject, see BOWMAN, ISAIAH, *The Andes of Southern Peru*, published by the American Geographical Society of New York, 1916.

air is descending from higher altitudes and is dry. Where the rainfall is sufficient, the chief agricultural lands are at elevations of several thousand feet. This is notably true of the coffee lands of Colombia and Venezuela.

While it is true that the high elevations provided by the Andes give cool temperatures, the climate is quite unlike that of the temperate zones with their pronounced change of seasons. A uniform, mild climate like that of Quito, for example, tends to breed easy-going habits and procrastination, while the wide

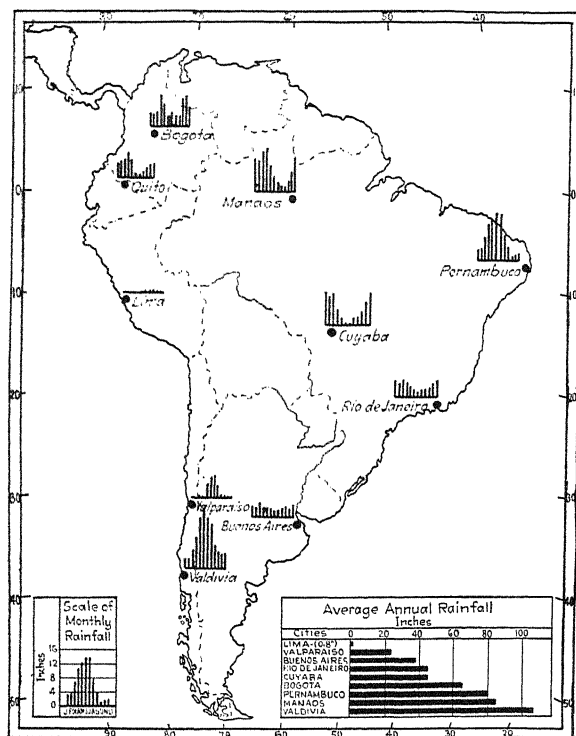


FIG. 8.—Average rainfall by months in various parts of South America.

variation of temperature of the intermediate zones, their alternations of summer and winter, and the passing of their cyclonic storms stimulate energy and make activity enjoyable. The fact that the tropical countries of northern and western South America contain land of high elevation is of immeasurable benefit to them, but it does not make intermediate-zone countries of them. In the southern third of Chile, the prevailing westerly

winds, heavily laden with moisture from the Pacific, are forced upward by the Andes, cooled, and made to precipitate this moisture. This gives southern Chile very heavy rainfall, but makes western Argentina and Patagonia dry (Fig. 7).

The Coast Line of Western South America.—It is well known that the surface of the earth undergoes, throughout long periods of time, upward and downward movements. If a coastal region that has hills or mountains sinks somewhat, the ocean backs up into the coast valleys, some of which may become deep and spacious bays; such, for example, are those on the coast of southern Chile. The drowned mouths of the Hudson and Delaware rivers form New York Bay and Delaware Bay. In fact, the majority of the fine harbors of the world are drowned valleys. If, however, the coastal lands are uplifted without deformation, then a strip of the adjacent ocean bottom is brought above the sea and is added to the previously existing coast lands; the river mouths become shallower, the coast line is made more regular, and such indentations of the coast line as do exist are shallow. A rising coast of this sort has few, if any, good harbors.

If the uplift produces a mountain range along the shore, as is the case along the west coast of South America, then a mountain-walled coast results; rivers are few and short, and their mouths make only small bays, if, indeed, deltas are not built. If the mountain chain is relatively uniform, with few or no spurs projecting off into the sea, as again is true along the west coast of South America, then a relatively even coast line is produced; there are few off-shore islands, few projecting headlands, and few indentations of the coast line. Along such a coast, large protected harbors are lacking. Such is the case along about four-fifths of the west coast of South America. From Panama to middle Chile, there is only one indentation of any size—the Gulf of Guayaquil in Ecuador. Elsewhere, the ports are mostly located where a small headland, or small inbending of the coast, affords on one side a slight protection from winds and waves. But from Guayaquil to southern Chile, western South America has not one harbor at which large ocean vessels regularly unload their cargoes directly upon piers or moles. Only vessels of light draft can do this, while larger vessels anchor off shore and discharge or receive cargo by the aid of lighters. This is another consequence of the great mountain uplift that brought the Andes into existence.

THE BRAZILIAN AND GUIANA HIGHLANDS

The Brazilian Highlands.—As a mountain system, the Andes are geologically young, but the Brazilian highlands are old, very old, dating from an early period in the history of the earth. So long have these ancient mountains been subjected to the action of weather and streams that their highest summits now rarely reach a third of the altitude of the Andine summits, and almost the entire area of the Brazilian highlands stands at elevations of 2,000 to 4,000 feet. What is equally significant, they present a subdued and rounded topography; most of the elevations are broad, most of the slopes are gentle, and the residual soil is deep. The valleys are usually open rather than gorge-like, and their slopes can generally be cultivated without wasteful soil wash taking place. In a few places, notably along the coast from Rio de Janeiro to Santos and southward, steep-faced ranges rise abruptly from the sea for a few thousand feet. In fact, the principal stream divide or water parting in southeastern Brazil extends parallel to the coast and close to it. Streams flowing westward into the Paraná river system rise within 20 miles of the Atlantic coast and flow away from it toward the interior. The highlands of Brazil are partially in the intermediate zone, but a much larger area lies within the tropics. These highlands make up about one-fourth the area of Brazil and, with the narrow coastal strip which lies between them and the sea, contain fully 90 per cent of the population and wealth of that country. In the highlands, the summer days are hot, but the nights are usually comfortable. In winter, frosts occasionally occur in the south and damage the coffee trees. Rainfall is ample for agriculture except in a small area in the northeast (Fig. 7). The winter temperature is delightful. The southern third of the Brazilian highlands, with its industrious population and its inflow of European immigrants, constitutes the heart of Brazil and its hope for the future.

The Guiana highland is the smallest in area and importance of the three highlands that form the mountain framework of South America. It is included partly in the Guianas and partly in Venezuela and is a main directing agent in determining the course of the Orinoco River (Fig. 1). In age and elevation, the Guiana highland is similar to the Brazilian but it is far less important. It lies in the very heart of the tropics, a considerable

distance inland from the coast, is densely forested, and is practically unexplored. It has no present economic significance.

The Coast Line and Coast Lands of Eastern South America.—

The eastern coast of South America is wholly unlike the western. For the most part, plains and low mountains face the shore, and at no point are such serious topographic difficulties encountered in entering the continent as are found on the west coast. For a thousand miles along the coasts of Argentina and Uruguay, plains meet the sea. Along a large part of the coast of eastern Brazil, as already pointed out, mountains skirt the coast, but they are not difficult to cross in comparison with the Andes on the west coast. Still farther north, a thousand miles of the coast lands of Brazil are low plains, mainly belonging to the Amazon lowland.

While the east coast of South America has few islands, no prominent peninsulas, and few large indentations, it nevertheless has good harbors in many places. One of the most perfect harbors in the world is that of Rio de Janeiro. The broad estuary of the Rio de la Plata, with its two world ports of Buenos Aires and Montevideo, is shallow, but it is made to serve the needs of a large commerce. Taken as a whole, the east coast of South America is favorable to the penetration of the continent, to commerce, and to economic development.

THE GREAT RIVER BASINS

South America has three great river systems draining three extensive plains, which make up the larger part of the continent and merge one into the other (Fig. 3). These river systems are the Amazon, the Plate, and the Orinoco. The area drained by the Amazon is approximately $2\frac{1}{2}$ million square miles, five-sixths of the area of the United States without Alaska. That drained by the River Plate system is less than one-half as large, while the Orinoco basin is still smaller. As a rule, valley plains in the intermediate zones are the most attractive places for human habitation. The greater part of such land is level or nearly so; the soil is fertile; movement from place to place is easy; and the occupations in which men engage are carried on easily in these favored lands. But such are not the conditions within the tropics. The continuous heat and the usually copious rainfall produce such abundant vegetation that man can

make little headway in conquering it, and weeds or the jungle hold their own.

The Amazon Basin.—In the vast basin of the Amazon, man has scarcely made an impression. The river is not the longest,



FIG. 9.—Scene in the tropical jungle of the Oriente or Montaña, on the eastward, rain-drenched slopes of the Andes, in Peru. So rapid and dense is the growth of vegetation that trails can scarcely be kept open. (Copyright Ewing Galloway, N. Y.)

but it is the largest in the world. Its headwaters reach almost to the western margin of the continent. The main river with its windings is approximately 4,000 miles in length and carries

a huge volume of water and silt to the sea. It has a score of tributaries which are themselves great and navigable rivers (Fig. 1). No less than 14 of them are as long as the Rhine or longer, and are greater in size. Their total navigable length exceeds 25,000 miles.

Lying in the belt of heavy equatorial rains, the precipitation over most of the basin is from 70 to 100 inches a year, as compared with an average of scarcely 30 inches in the Mississippi basin. The heat and moisture give rise to a dense tropical forest that clothes the greater part of the land, broken here and there by open grass lands. So rapidly and luxuriantly does wild vegetation grow that man finds it next to impossible to keep it removed while a cultivated crop is growing. It is an uneven contest, and man usually gives up the struggle and the jungle triumphs.

Plains of the River Plate System.—Second in area, but first in importance among the three great plains of South America are the plains of the River Plate. The river is merely a broad and shallow estuary which receives the water of the Paraná and Uruguay rivers. These plains have an area equal to that of the United States east of the Mississippi River, or about 1 million square miles. The highly important fact about them is that they lie mainly in the intermediate zone and include one of the great agricultural regions of the world. The southern part of this region does not drain into the River Plate but belongs to the same great plain. Included in the region are (1) all of Paraguay, (2) nearly all of Uruguay, (3) the larger and better part of Argentina, (4) a quarter of Bolivia, and (5) a minor part of Brazil. The Bolivian and Brazilian parts and a third of Paraguay lie within the tropics. Owing to the stimulating quality of the climate, the fertility of the land, and the relatively good means of transportation, the cooler portion of these plains is attracting an enterprising class of immigrants and is making notable progress. It is the only large area in all South America where one finds extensive agricultural lowlands in middle latitudes. It may be regarded as economically the most important part of the continent.

The Paraná is one of the world's great rivers, longer and larger than the Mississippi, navigable for ocean steamers as far up as the city of Rosario; and its main tributary, the Paraguay, carries steamship navigation 1,300 miles into the heart of southern Brazil. The Pampa of Argentina with its millions of acres of

fertile land, its enormous crops of cereals, its herds of cattle and flocks of sheep; the great stock-raising interests of Uruguay; the modern railway systems; the great ports of Buenos Aires and

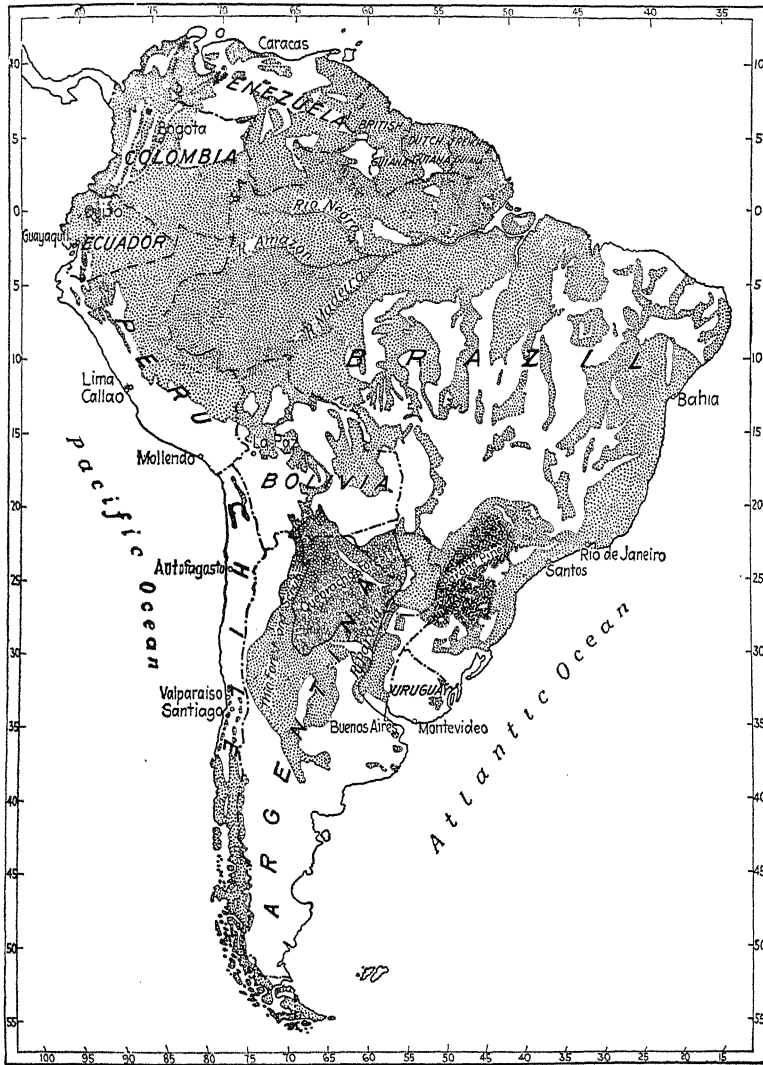


FIG. 10.—Forests of South America (stippled). (Zon and Sparhawk, *Forest Resources of the World*, Vol. II.)

Montevideo; the rapidly growing wealth of this region, all combine to make this the outstanding section of South America.

Plains of the Orinoco River.—In the extreme northern part of South America—mainly in Venezuela—is the third of the major river plains of the continent. The Orinoco itself is about 1,500 miles in length, and the area of the *llanos*, as its grass-covered plains are called, is approximately 120,000 square miles, or equal to that of two states like Illinois. Lying between the parallels of 5° and 10°N., the llanos have high temperatures, with a wet season during which the low plains are inundated, and a dry season, when the parching trade winds blow up the valley, the grass turns brown, and the cattle have scarcely enough feed to keep them alive.

The Orinoco and its main branches are navigated by a few river steamers, but the small population and few products cannot support frequent steamship service. The only city of even moderate size (Ciudad Bolívar) is a few hundred miles up the river and may be reached by river boats of 10- or 12-foot draft. It is believed that fewer people now live in the Orinoco Valley than lived there 400 years ago when the Spaniards came. The raising of cattle, still the chief occupation, was formerly much more extensive than it is now. So far as their effect upon the economic development of South America is concerned, the llanos are of little importance.

SIGNIFICANT CLIMATIC CONDITIONS

Effects of Diseases Peculiar to Tropical Lowlands.—Certain dreaded diseases are prevalent in tropical lowlands, and this fact retards the economic conquest of these regions. Among the most important of such diseases in South America are malaria, yellow fever, tropical dysentery, and the hookworm disease.

Malaria is widely prevalent in the tropical lowlands of South America. The germ is carried by mosquitoes of the genus *anopheles* that have bitten persons having malaria. The disease is pernicious and is one of the chief obstacles to the occupation of the lowland tropics by white people. The ignorant natives cannot be induced to take the necessary precautions, and disease-carrying mosquitoes cannot be eliminated. Whites and non-whites suffer from the disease. It does not, as a rule, kill its victims quickly, but saps their vitality. The following account pertaining to the lowlands of Venezuela would apply equally well to the tropical lowlands of other parts of South America:

"The best-developed agricultural region, around Lake Valencia, is also hot, and tropical diseases are rife. Workmen from the higher towns of the western interior or from Caracas are difficult to obtain and hold in this region on account of the prevalence of malaria. The sugar plantations of the Maracaibo basin are noted in the country for the extreme tropical climate and tropical conditions. Even the Goajira Indians, natives of the region to the west of the lake, suffer from regular epidemics of malaria during the latter part of the rainy season. Any extensive development in agriculture, such as cotton or sugar-cane planting, would have to be undertaken with full attention to sanitation and medical service on a scale with the work contemplated. This expense must be taken into consideration, as well as the prevalent anemia, which detracts from efficiency in all lines of work. The investment in sanitation and medical educational methods is, of course, high, but it has proved necessary in the tropics and is more than repaid by the maintenance of a sufficient working force and the generally increased physical ability of the men engaged in the field work. The natives of the country, born and raised in the same tropical regions, are not immune to malaria, but suffer from it in latent form. Neither is West Indian labor (negro) immune, although less subject to the more pronounced form of malarial fever. In connection with the effect of climatic conditions on labor in general, it may be well to add here that measures taken to improve the diet of persons engaged in heavy labor in the tropics have resulted in increased efficiency. The principal needs are fresh vegetables and cereals and improvement in methods of preparing food."¹

Yellow fever, which at times has made certain parts of South America veritable pest holes, is now nearly under control. It has been proved that a mosquito of the genus *stegomyia faciata* is the carrier of the germ of this disease. By biting a sufferer from yellow fever, the mosquito becomes the host of the fever parasite and may introduce it into the system of any person whom it afterward bites. Thus the disease spreads. By getting rid of stagnant water in which mosquitoes breed, and by using screens on doors and windows, the spread of the disease is retarded, and in many cities (Habana, New Orleans, Santos, Panama, and others) it has been eliminated. The fact that negroes enjoy almost complete immunity from the disease is one reason for their predominance along these tropical coasts.

Tropical dysentery arises from an intestinal infection. It is most severe in hot, wet regions and diminishes with increasing

¹ BELL, P. L. *A Commercial and Industrial Handbook of Venezuela*, p. 16, U. S. Dept. of Com., 1922.

distance from the equatorial belt. It is transmitted by germ but may be largely avoided by care in the use of drinking water and by a generally temperate and hygienic mode of life. The ignorant and careless colored people seldom take these precautions, and the disease spreads as much because of neglect as because of climate.

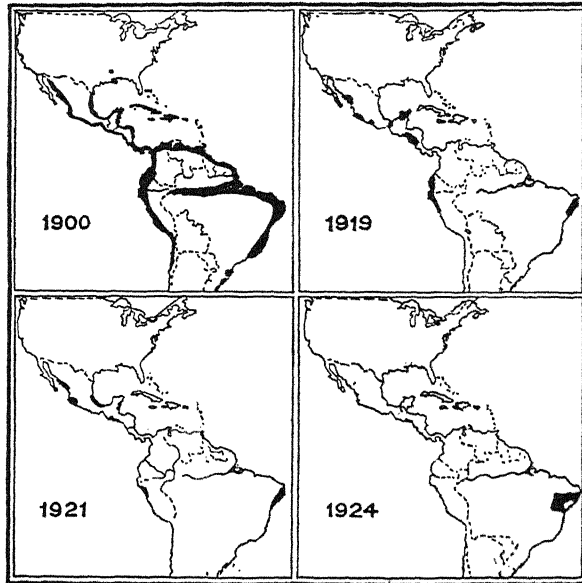


FIG. 11.—The retreat of yellow fever. It has now nearly disappeared from tropical America. (Rockefeller Foundation.)

The hookworm disease is due to an intestinal parasite and is confined chiefly to warm and hot climates. The parasite breeds in human filth and gets into the intestinal tract in various ways. Its effect upon the sufferer is pernicious, robbing the red blood cells of their vitality, producing anemia, breaking down the bodily resistance to other diseases, and rendering the victim listless, pale, weak, and unambitious. It affects mainly those who live in unsanitary conditions in hot climates, and its victims in tropical America are numbered by the millions, although conditions there are no worse than in many other warm countries. Where the disease is prevalent among the people, economic progress is slow or stagnant, for the sufferers themselves usually are content with a bare living. As laborers, they are necessarily inefficient.

Happily, the disease is readily curable where the patient can be induced to cooperate with the medical authorities. Great service is being performed by the Rockefeller Sanitary Commission for the Eradication of Hookworm Disease.

Indirect Relations of Tropical Climate to Diseases.—The so-called tropical diseases also exist outside of the tropics, but rarely to a menacing extent. The abundant heat and moisture of the tropics are favorable to the multiplication of micro-organisms. Moreover, tropical races include a high proportion of illiterate people who cannot be reached and enlightened through printed advice. They are careless and unsanitary, and too poor to have proper medical attention. Frequently, they are undernourished and low in disease resistance. The municipal governments in tropical cities usually lack the funds, knowledge, and energy necessary to fight the unsanitary conditions which breed diseases. Where a determined fight, backed by knowledge and money, has been maintained, tropical diseases have been reduced or eliminated, but it is an expensive undertaking and cannot be carried out over large areas at once. Steady progress is being made, however, and there are those who believe that in time the tropics may become relatively free from the worst diseases. At present, the bad health conditions in most tropical lowlands are an effective reason why white men shun them and leave them largely to the colored races. The initiative and energy necessary to develop the tropics must come mainly from cooler climes.

Climate and Negro Slavery.—The white man cannot safely do hard, out-of-door labor in the tropics, nor does he feel like doing it. The blacks of tropical Africa were brought to the West Indies, Brazil, and the southern United States soon after the discovery of America. Negro slavery never gained a hold in the cool lands where the white man is accustomed to manual labor. It was essentially an outgrowth of the white man's attempt to develop hot regions. Slaves became numerous in both Americas and finally were liberated during the nineteenth century. Their peculiar fitness for living in low latitudes and the general reluctance of whites to live in communities where negroes greatly predominate have brought it about that the islands and coast lowlands of the Caribbean and a part of Brazil are occupied largely by negroes and mulattoes. In Peru, Bolivia, Ecuador, Mexico, and Central America, Indian laborers have held their own, and very few negroes are found. Climatic and social

considerations have made the white man the master and the colored man the worker. This relationship perpetuates in the white man a sense of superiority and a feeling that the colored man must be "kept in his place" and be made to do the distasteful kinds of work.

Tropical White Man's Attitude toward Labor.—While this attitude is explainable and probably inevitable, it is the curse of tropical countries. The reaction upon the white man is bad. His constant contact with people whom he regards as menials and his own feeling that those who labor belong to an inferior order of society and that a gentleman should not work with his hands, kill the white man's initiative and create easy-going habits. Such is the price that the white man pays for the easy life of the tropics and for the negro slavery of the past.

Happily, no South American country consists wholly of tropical lowlands. All of the countries that lie within the tropics include highlands upon which people of European stock may live in health and may preserve at least some of the vigor which characterizes the dwellers in cool latitudes. Here, the beneficial effects of the cooler temperature are partly offset by the presence of the Indian peons and half-breed laborers who do the manual labor and create the same class distinction between master and servant that exists where negroes are numerous. The price that is paid for this attitude toward labor is seen in the effect upon European immigration into parts of Latin America where this attitude exists, for white immigrants from Europe avoid these lands. They prefer to go where laborers are respected and where they do not have to compete with low-paid colored labor. In South America, they go to the uplands of southern Brazil, to Uruguay, to Argentina, and in smaller numbers to Chile. They shun the tropical lowlands and leave their economic development to inefficient native workers or to imported Orientals who are found but little more efficient under the same climatic conditions.

Consequences of the Low Productive Power and Low Purchasing Power of Tropical Peoples.—In addition to reasons of malnutrition, disease, ignorance, and lack of ambition already discussed, another reason for the backward economic state of the tropical peoples should be pointed out. Employers declare that more work cannot be secured by paying higher wages, for the native worker will simply work fewer days in the week. If 2 days' work a week will earn enough to supply his simple

wants, why go to the trouble of working more? In a hot climate, little clothing is needed; a quickly made hut furnishes shelter; a few banana trees and a patch of corn, beans, and manioc supply food; loafing is the most agreeable of luxuries. In his opinion, the greatest luxury is ease; why sacrifice this to secure something less desired? Thus, the great majority of these people produce little more than they consume.

Social wealth is created mainly by labor, by producing more than one consumes, and by saving something to be contributed to social capital or to be employed in building railways, factories, ships, and public utilities, which in turn become agencies for creating more wealth. In this way, economic life is quickened, productivity is stimulated, purchasing power is increased, and a nation rises in the scale of economic well-being. But in a society where, for climatic or other reasons, men do not practice industry and thrift, progress is slow or retrogression may occur.

The Problem of the Development of the American Tropics.—

Several of the West Indies have attained a considerable degree of economic development, mainly agricultural, for they have had the aid of leadership and capital from cooler lands. Cuba, Porto Rico, Trinidad, and, to a certain degree, other islands have made much progress, and their people, colored or white, enjoy something of prosperity, have acquired some education, and are fairly healthy and happy. But the republics of tropical America are finding their problems of development difficult, partly because the solution of these problems requires greater funds than they can command. However great the potential resources of these countries may be, money is needed to develop them; but most of these countries are not creating capital nearly so fast as they need it. They are constantly seeking loans abroad, and when these are obtained, they are not always used wisely. Interest charges grow and sometimes go unpaid with disastrous effects upon national credit. In order to secure foreign capital for the development of resources, these resources are frequently turned over to foreign corporations, which are allowed to build and operate railroads, docks, and public utilities. Banking and foreign trade are largely in foreign hands, with the result that the earnings of the country are steadily flowing out into foreign lands. Yet it must be either this or economic stagnation. A large part of these difficulties arise from the lack of national capital, which lack is due to social and political deficiencies for

which a tropical climate is partially accountable. Any large and permanent development of the hot tropics seemingly must get its impetus, funds, and leadership from the cooler climates.

Summary of Climatic Conditions in South America.—1. Half of South America suffers from too much heat, as half of North America does from too little.

2. The continent suffers from too much rainfall in most of the tropical lowlands, and too little on the west-coast highlands from southern Ecuador to northern Chile, and in western and southern Argentina (Fig. 7).

3. In the tropical latitudes, the highlands provide regions of considerable size in which white people may live and retain their energy.

4. Because of narrowness in the south, the continent affords only a relatively small area of temperate lowlands.

5. The negro population is found chiefly where high temperature makes the white man unwilling to do manual labor.

6. For climatic reasons, the highlands of southeastern Brazil, the plains of the River Plate and the Valley of Chile must be the chief regions of power and progress in South America.

7. The secondary centers of progress are in the highlands of the Andes, where altitude offsets latitude, and on the irrigated coast lands of Peru, where the cool Humboldt current favorably affects the temperature.

8. The great areas of potential production are in the tropical lowlands, and these are the regions which will supply an increasing part of South America's economic products; but it will probably be done under leadership supplied from cooler lands.

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CHAPTER II

COLOMBIA

Geographical Advantages and Handicaps.—Colombia's natural advantages and handicaps are much interwoven, and a given geographical condition not infrequently may be a benefit to the country in one respect and a handicap in another. For example, the location of Colombia, facing both on the Pacific and on the Caribbean and very close to the Panama Canal, is, from the standpoint of ocean commerce, highly favorable. But the geographical factor of location means, also, that the country lies within the tropics and must accept the handicaps which a tropical climate imposes. Again, the lofty mountain barriers, which stretch the entire length of the country, make interior communication extremely difficult, and thus retard the development of the nation. Yet, these same mountains, by their high altitudes, give white people a place of residence so elevated that it is removed from the enervating effects of the tropical lowland climate. However unfavorable to national progress the mountains and plateaus are in certain particulars, the country would be worse off without them. In fact, the great lowlands of the southeast (Fig. 12) are little explored and almost unoccupied. The size of the country (435,000 square miles) is an advantage, for it insures a wide variety of resources and products. Yet, the country is not so large that national unity need be endangered on account of unwieldy size.

When all the geographical features are balanced, favorable against unfavorable, the handicap of a tropical location cannot be belittled. In the tropics, white men, as a rule, avoid physical exertion or take it only mildly. They find it more agreeable to have work done by the colored peoples and thus have established a dependence upon them. It is neither fashionable nor agreeable in the tropical lowlands to do manual labor if one is white, and the fashion has long since spread into the highlands as well. The joy of physical activity and the consciousness of strength and ability to achieve, which are possessed by people of middle

latitudes, react favorably upon them. Ambition and aspiration are nourished, and under such conditions, a virility of race and a will to advance are maintained. Conditions within the tropics



FIG. 12.—Relief and railroad map of Colombia.

are not so favorable and there is no strictly tropical people that can be accounted masterful. Such a country as Colombia may be prosperous and fully respected in the family of nations;

it may grow in wealth and standing; but it can never escape the direct and indirect consequences of a tropical climate. The tropical peoples are to be commended for the progress they are making under many handicaps rather than criticized because that progress is not more rapid.

Physical Framework of the Country.—Colombia has an area greater than that of the original thirteen states of the American Union, and approximately that of England, France, and Germany combined. The outstanding feature of its topography is the Andine mountain system whose three massive ranges traverse the country for the entire thousand miles of its north-south extent, and in the north spread out like three great fingers. These are the eastern, central, and western cordilleras. In addition, there is a lower coastal range in the northwest. On the eastern flank of the eastern cordillera lies the lofty tableland of Bogotá, one of the two most thickly populated parts of the republic. The highlands and the elevated agricultural valleys associated with them constitute white man's Colombia, while off to the east and southeast stretch for hundreds of miles the vast jungles of the Amazon and the grassy plains of the Orinoco. Together these lowlands form three-fifths of the area of the country, but they are so remote and so tropical that they remain almost unclaimed, awaiting some distant future when the pressure of the world's population shall push homeseekers into them. Between the mountain ranges, whose highest peaks exceed 20,000 feet, three rivers flow northward. The westernmost and least important is the Atrato, 400 miles in length. So close is this river valley to the Pacific that it has been considered as a possible route for a portion of an interocean canal. The middle river is the Cauca, about 600 miles in length, flowing through a rich valley into the Magdalena. The Magdalena is about 1,000 miles long and is the country's chief river and chief highway of commerce.

An Unfavorable Coast Line.—Colombia has a coast line about 460 miles in length on the Pacific Ocean and 640 miles on the Caribbean sea, 1,100 miles in all. Throughout this distance, there is not one first-class harbor. From the Magdalena eastward, the coast has no river of any size which might offer a protected estuary. The mouth of the Magdalena is a swamp with offshore sand bars which are constantly forming and shifting. A little to the west of the river's mouth lies Puerto Colombia, the chief

port of the country, connected by a railway to Barranquilla on the Magdalena (Fig. 12). The harbor of Puerto Colombia is shallow and poorly protected. Sixty-three miles farther to the west is the famous old city and stronghold of Cartagena, once the chief seaport and fortress of all Spanish America. Now the city has only a shallow second-rate harbor. From Cartagena to the Panama boundary, the coast is generally low, jungle covered, and possessed of no harbor of any consequence. The entire coast reeks with malaria, the scourge of the lowlands; only at Santa Marta, where the United Fruit Company's hospital and staff are combating the disease, is effective progress being made. The entire Pacific coast of Colombia is drenched with almost daily tropical downpours, which produce a dense and tangled growth of forests. Only from the disease-infected port of Buenaventura on the Pacific does a railway lead from this coast into the interior and give the well-populated upper Cauca Valley connection with the sea. In considering the foregoing unfavorable features of the Colombian coast, it is to be remembered that other coasts equally unfavorable have been made to serve excellently the needs of commerce. Santos in Brazil was a fever-cursed swamp before modern science and engineering transformed it into one of the healthiest ports of Brazil. Habana, Panama, and Guayaquil are other examples of successful sanitation. But such work requires large sums of money which must be wisely and honestly expended to be effective.

The Population.—Colombia has approximately 6 million people, very much mixed in lineage. The three fundamental stocks are: (1) Indians of many tribes and characteristics, whose ancestors occupied the land before the Spanish conquest; pure-blood Indians still form a significant part of the population; (2) whites of European ancestry, and mainly of Spanish descent; (3) negroes descended from ancestors brought as slaves from Africa. Now, after many generations of intermarriage, there are fewer pure bloods of all these types than there are mixed bloods.

A relatively small proportion of the old Spanish families retain their purity of stock, and many so-called whites have a strain of Indian or negro blood. The white people are estimated at 10 per cent of the population. Among them are people of wealth, culture, and ability. They enter the learned professions and some of the larger business enterprises and are prominent in social and official life. As a rule, they retain the old Spanish

traditions and are proud, polished, and pleasure loving. They regard manual labor as the occupation of menials and prefer office holding, professional life, and leisure to business occupations. This class is best represented in Bogotá, which is sometimes called by its people "the Athens of South America."

A different type is found in the higher lands of the progressive Department of Antioquia. So different are the leading people of this region from Colombians generally that it is a matter of comment on the part of visitors. It is said that in the colonial period a considerable immigration of Spanish Jews into Antioquia took place, and that their descendants now constitute the energetic, industrious, thrifty, and business-like population of the region. There are many evidences that the future economic progress of Colombia is notably in the hands of the people of Antioquia and their enterprising city of Medellín.

Mestizos (mixed Indians and whites) and mulattoes form the majority of the population of Colombia. The negroes and mulattoes occupy the coast lands and lowland valleys. They are seldom found in the high mountains or plateaus. They have the easy-going, indolent traits of their race but form the laboring population of the lowlands to which they are better adapted than any other people. They live poorly and have small buying power. They perform certain necessary kinds of work but contribute little to the upbuilding of the nation.

The mestizos are the most numerous group. They form the better class of laborers and the small shop keepers of the towns and the highlands. The Indian seems incapable of fitting himself to modern life. Left to himself, he makes no progress and receives little help from the whites or mestizos. He is the drudge of the nation but an important factor in its labor supply.

Colombia has a burden in this preponderating population of illiterate colored and mixed peoples, few of whom can take places of leadership or assist constructively in carrying the nation forward, and yet whose labor is essential. There is very little immigration into the county; hence, the population of the future seems likely to be, so far as numbers go, dominantly colored; that is, mestizo, mulatto, and further mixtures.

MINERAL RESOURCES

Difficulties of Prospecting and Mining.—The same retarding influences of climate and land surface which hinder all other

forms of development in Colombia also interfere with prospecting and mining. At altitudes below 5,000 feet, malaria is a constant menace to those who expose themselves to the swarms of anopheles mosquitoes. The intense heat and high humidity of the lowlands rob white men of their energy. Even the negroes will not work long at a time in the platinum and gold workings of the lowlands. It is said that 300,000 of them go to this region yearly,

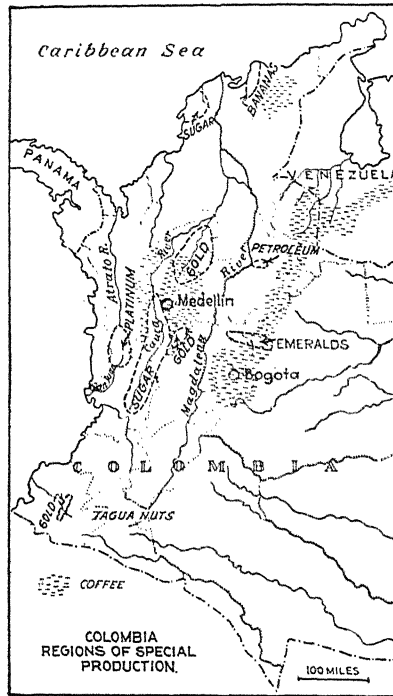


FIG. 13.

but that only about 3,000 are working at one time. The dense vegetation obscures the rock formations and makes prospecting extremely difficult, costly, and uncertain. If perchance a rich mineral vein is located, it will probably be scores of miles from a railway or navigable water. The cost of bringing in supplies, transporting and installing machinery, and getting the minerals to market often prevents the profitable working even of rich ore bodies, and hundreds of promising ventures have failed. In fact, most of them have failed. In Colombia, as in other gold-mining regions, the proportion of successful mines is small.

Gold and Silver Production.—Spain's interest in her American colonies was primarily an interest in their gold and silver; and the energies of the Spanish adventurers were mainly directed to the discovery and mining of these two precious metals. The forced labor of the Indians and the negro slave labor cost little, and hundreds of placers were profitably worked by crude hand methods. Gold and silver mining was the main industry of the country during the colonial period (1537 to 1819), and Colombia produced more gold than any other colony in South America. The value of the gold and silver sent out of the country during those 282 years is uncertain, but is estimated at more than 500 million dollars,¹ a vast sum for that period. If these figures are approximately correct, then the average annual production was somewhat less than the average of recent years for Colombia, which has been about 4 million dollars. Only a minor part of this represents profit, for the present cost of production is high. The silver output is now unimportant, but the gold output holds up well, making Colombia the leading producer of gold in South America. This means little, however, for no South American country yields much gold in comparison with South Africa, Australia, or the United States. Most of the gold mines are in the western and central ranges which have supplied fully 95 per cent of all the gold mined in the country; and the Department of Antioquia has yielded half of the total output. Some years ago, there were in operation in this province 600 gold mines, of which 30 of the largest were in foreign hands. Both placer mining and vein mining are carried on; but placer mining has been much the more important, because the gravels can be washed by individual workers without capital. It is generally believed that Colombia has a great deal of undiscovered gold and other minerals, but the difficulties of finding them and the cost of mining and getting them into the channels of commerce are nearly prohibitive. The value of the minerals is future rather than present. A great deal of glamor hangs around gold mining, and it holds an importance in the public mind far out of proportion to its merits. Many of the humble agricultural products such as plantains or yucca have a greater annual value to Colombia than its gold; and coffee is ten or twelve times as valuable.

Platinum.—Because of the rarity of this metal and its important uses in certain chemical and electrical industries, its presence

¹ MILLER and SINGEWALD. *Mineral Deposits of South America*, p. 348.

in Colombia is more significant than its money value of 3 or 4 million dollars a year would suggest. In only two parts of the world has this superprecious metal been found in quantity, namely, in the Ural Mountains of Russia and in western Colombia. Before 1914, Russia furnished about 90 per cent and Colombia 10 per cent of the world's supply. The disorganization of all Russian industries, which came with the World War and the Russian Revolution of 1917, caused the Russian production of platinum nearly to cease, and Colombia rose to the place of leading producer. Platinum is found in small quantities throughout much of western Colombia, and when found, it is invariably found in association with gold. All of the product comes from placers, and until 1915, it was mostly obtained by individual miners washing the gravels by hand. The gold and platinum are found in gravel beds which were weathered and eroded from older deposits in the rocks farther up the rivers, but in the case of platinum, these parent veins have not been located. There are two principal platinum-mining districts; the lesser one along the Patia River in the extreme southwest of Colombia, and the other much more productive region near the headwaters of the Atrato and San Juan rivers in the Department of Choco (Fig. 13). No railroads reach these regions, and communication with ports is carried on by mules, small river steamers, and canoes. Much of the washing of the gravels has been done in a desultory way by negroes who work intermittently. A number of foreign dredging companies with modern machinery now operate more or less successfully. Only a very small proportion of the persons engaged in these operations are white, for it is a fever-infected region. On certain occasions, whole dredging crews have died in a few months. The small operators dispose of their gold and platinum to traveling buyers, usually Armenian merchants who exchange goods for the metal. The miner gets only 25 or 30 per cent of the market value, which has ranged from \$23 a troy ounce in 1908 to \$164 in 1920. Gold has a value of about \$20 an ounce. Most of Colombia's annual production goes to the United States.

Coal.—Very little is accurately known of the coal resources of Colombia. Beds of coal exist, but no comprehensive survey has ever been made. The quality is generally poor, although certain beds near Medellin yield coal which is coked for use in smelting local iron ores. Near Cali in the Cauca Valley, five or

six small mines are worked in an intermittent way, mainly to supply coal to the Pacific Railway which connects the valley with the Pacific coast at Buenaventura. Only a few thousand tons are mined annually. The following statement covers the ground as well as it can be covered briefly with the existing meagre information:

"It is impossible to give any accurate description of the many coal fields of Colombia or any estimate of the probable extent of the various deposits, but the country has in its coal a valuable asset, almost untouched and very little explored or even known. A few coal mines that have been opened are all worked superficially and by very crude methods to supply a small local demand and for the short lines of railway in their respective regions."¹

Petroleum.—A great deal of money has been expended in prospecting for oil in Colombia with very little success until 1919, when several wells, including three flowing wells, were brought in by an American company at Infantas, 35 miles east of the Magdalena River and 360 miles inland from the Caribbean (Fig. 13). A refinery was built on the Magdalena and connected with the wells by a pipe line. In 1925, a pipe line to the Caribbean coast, 360 miles, was completed. The discovery of oil stimulated further search, and at one time as many as nine oil companies were actively exploring in Colombia. The results, however, proved disappointing.

The producing of oil in the interior of a tropical and mountainous country like Colombia is very expensive and can be successfully financed only by strong companies. The chief Mexican fields are near the sea as are also those of Peru and Venezuela. Under such conditions, oil can be marketed cheaply. Not so when the wells are hundreds of miles inland in a country like Colombia. Adverse geographical conditions may rob the enterprise of all its profits. In so far as the products can be marketed within the country, the existing wells in Colombia are not unfavorably located, for they lie between the two most populous districts of the country—that around Bogotá and that of which Medellín is the center. Practically all of the production of Colombia is used within the country and is sufficient for its limited needs.

¹ BELL, P. L. Colombia: A Commercial and Industrial Handbook, *Special Agents Series* 206, U. S. Dept. of Com., 1921.

Emeralds.—Colombia is the chief source of the world's supply of emeralds, the mining of which is a government monopoly, carried on under the strict surveillance of the national police to prevent stealing by the workmen. All of the four districts where emeralds are produced are in the general region of Bogotá (Fig. 13). The gems occur in calcite veins in limestone and are mined by Indian workmen by crude methods. The two famous mines—the Muzo and the Cosquez—have a normal annual output of about 1 million dollar's worth, but this fluctuates widely from periods of active demand to periods of small demand. The extent of the emerald-bearing veins is unknown, but it is believed to be very large. As an industry, this one is rather more unique than important.

Other Minerals.—Very little is known of other mineral resources in Colombia. A little iron is regularly mined, and there are small local blast furnaces near Bogotá and Medellín. From what is known of the geology of Colombia, it is reasonable to expect that a great deal of mineral wealth may be found when the country attains a higher stage of development, and when better means of transportation and more capital are available. At present, the cost of exploration and mining is very high, which partly accounts for the fact that the total annual value of mineral products is only about one-fourth that of coffee alone.

AGRICULTURE

Influence of Climate and Topography.—Since Colombia lies wholly within the tropics and in the hottest part, its agriculture is entirely tropical except at high altitudes. The type of agriculture which is carried on by the colored people is primitive and easy going, and does little more than furnish a scanty living for the people themselves. An exception to this is found in the banana plantations near Santa Marta on the Caribbean coast where the United Fruit Company has extensive banana lands. In this region, independent banana growers have gained a stimulus from this company and raise fruit for export. There is also a development of scientific sugar culture to be mentioned later (p. 41). Most of the agriculture of Colombia is upland and mountain agriculture, carried on rather crudely and under severe handicaps. Coffee is the one important exception to this general statement. Modern agricultural machinery is little used, and over large regions a steel plow has never been seen.

Four food crops are raised almost everywhere, yucca, corn, sugar cane, and plantains, and they form the staple foodstuffs of the people. Plantains and bananas grow around every home and take the place filled by potatoes in the North American diet.

Tobacco.—One of the few agricultural products which reach any importance in Colombian exports is tobacco, whose annual export has once (1918) reached a million dollars. The average is about half that amount. Tobacco manufactures—especially cigarettes—are one of the leading, though small, manufacturing industries of the country.

Sugar.—As a rule, sugar cane is raised in small patches, and is ground in crude, home-made mills of which there are 4,700 in the



FIG. 14.—Sugar producing regions of South America. (*Pan-Am. Union.*)

single department of Antioquia. The sugar is made into small cakes of *panela* (unrefined, brown sugar) and used locally. About 4,000 of these little sugar mills are operated by hand power or animal power, and 700 of them by water power. Cane is the leading crop of the Cauca Valley, one of the best sections of Colombia. But in the entire valley, there is only one modern sugar mill.

Sugar is the leading crop near the coast city of Cartagena, but here also there is only one scientifically managed sugar plantation

having a modern mill and equipment. The company has 45,000 acres of land and an investment of about 2 million dollars. Its output of sugar is about 10 million pounds a year. This region is thought to have genuine promise as a sugar-growing section, because of rich soil, favorable temperature and rainfall, and—what is no less important—easy accessibility from the sea. Owing to its nearness to the United States, the Caribbean coast of South America is likely to be the next region into which American capital will go to develop sugar plantations, when Cuba and Porto Rico shall have approached their capacity.

Bananas and plantains are grown widely as a food. As already mentioned, an American fruit company has one of its large modern banana plantations near Santa Marta (where irrigation is necessary) and exports several million bunches of fruit annually.

Minor Crops.—Wheat to the extent of a million bushels a year is raised on the high tableland of Bogotá, but it costs more to ship it to the flour mills of Barranquilla on the coast than it costs to bring wheat to them from the United States. Cotton is grown to a moderate extent in the Magdalena Valley near Barranquilla; a little is also raised in the Cauca Valley and in the region north of Bogotá, but methods are crude and the product of uncertain quality. It is all required by the cotton mills in Medellín and Barranquilla. The making of coarse cotton fabrics is the leading manufacturing industry in Colombia.

Importance of Coffee to Colombia.—Coffee is as important to Colombia as it is to Brazil, but its production is, of course, on a

EXPORTS FROM COLOMBIA - APPROXIMATE ANNUAL AVERAGE

Coffee - \$35,700,000	Gold \$500,000	Bananas \$3,400,000	Rubber \$2,500,000	Platinum \$350,000	All Others \$3,000,000
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FIG. 15.

much smaller scale, Brazil producing about seven times as much as Colombia. Between 70 and 80 per cent of the value of all exports from Colombia is creditable to coffee alone, and the country ranks second only to Brazil in its production (Fig. 165). It is largely the income from this crop of 275 million pounds that permits the people of Colombia to buy needed imports and to pay the interest on foreign obligations.

Coffee is grown in many parts of the country, both by large planters and small, but mainly by the latter. The income from this crop reaches a large part of the population and provides the main source of revenue for the railways and river steamers. When the crop is good and prices are good, the whole country feels the stimulus that it gives to business; but when the crop is poor or the prices are low, the whole financial life of the country is depressed.

Suitableness of Coffee to Conditions in Colombia.—"Coffee is the economic salvation of this mountainous country . . . Coffee grows on the steep slopes of the mountains at elevations varying from a few hundred feet to as high as 9,000 feet above sea level in nearly all parts of the country, on lands that could not be used for any other purpose. Few tools or equipment other than the universal machete are required, and there is no cultivation other than that of chopping out the larger weeds between the rows of trees. Very little labor is required other than that for picking the ripe berries, for which unskilled labor is employed. Women and children work as well as the men, the ripe coffee berries containing the beans being merely stripped from the branches of the low coffee trees and carried to the drying places. The machinery required for shelling and hulling the beans is not complicated or expensive, and large plants are not necessary."¹

Coffee is essentially non-perishable if properly protected. It can, therefore, be stored without deterioration, and is not necessarily injured by delays in transit, which are characteristic of Colombia. As a matter of fact, however, injury often does come to this coffee because of exposure in transit. Bags of coffee are conveniently carried on mule back, and most of the crop is carried one or more times in this way before it reaches the sea coast. All things considered, coffee production in Colombia represents the most suitable adjustment of man to his environment in this mountainous region.

The Chief Coffee Districts.—About half of the coffee of Colombia is produced west of the Magdalena River and half east of it. That on the west is grown chiefly on the slopes of the central cordillera in the two departments of Antioquia and Caldas. There is a smaller production in the upper valley of the Cauca River (Fig. 13). On the east, there are also two important departments traversed by the eastern cordillera—Santander and

¹ BELL, P. L. *Colombia: A Commercial and Industrial Handbook, Special Agents Series 206*, U. S. Dept. of Com., Washington, D. C., 1921.

Cundinamarca. Santander del Norte is also a large producer, exporting most of its product through Venezuela.

The main coffee areas are also the regions of greatest population and highest economic development, namely, the departments of Antioquia and Cundinamarca. Together, they yield about half of the Colombian crop, each department having between 30 and 40 million coffee trees.

Recent Increase in Coffee Production.—The high price of coffee in 1919 and again in 1924 stimulated coffee planting in Colombia, which has nearly a million acres devoted to this crop, mainly in small farms. Unlike the case of Brazil, where very large plantations exist, 25,000, to 40,000 trees make a large plantation in Colombia, while several million trees are to be found on the largest plantations in Brazil. In all, Colombia probably has 270 million trees, each yielding an *average* of 1 pound of cleaned coffee a year. The exportation in 1910 was a little over 500,000 sacks (of 138 pounds each), but in 1915, it passed 1 million, and has lately attained nearly 2 million. Over three-fourths of the total exportation goes to the United States, where, on account of its mild flavor, it brings a higher price than the Brazilian coffee. Colombia is capable of much greater production, and if the efforts of the Brazilian planters to maintain high prices are successful, Colombia and other coffee-growing countries will unquestionably increase their plantings.

Stock Raising.—The 5 or 6 million cattle in Colombia constitute one of its largest sources of wealth. Yet Colombia cannot be regarded as a good country for raising and marketing cattle in any such sense as Uruguay, Argentina, or southeastern Brazil are. Since colonial days, cattle raising has been a leading occupation in Colombia because land has been cheap and abundant; and in a land of poor transportation, cattle can be driven to market. Meat has been cheap and the people are large meat consumers, but the exportation of cattle or of beef from the more remote districts is impossible. Some cattle are shipped to Cuba, and for several years, rather large numbers were shipped to the Panama Canal Zone, but most of these came from pastures near the Caribbean coast. As a rule, the Colombian cattle are of inferior quality, as the native cattle are in all South American countries. Very little improvement has been brought about in Colombia by cross-breeding with superior imported stock as has been done in Argentina and Uruguay. The tropical

climate is favorable to insect pests and cattle diseases, and these must be constantly fought by the use of serums, by dipping to kill cattle ticks, and by other precautionary measures. The cattle are lank and bony and make indifferent beef.

There are three principal regions of cattle raising in Colombia, although cattle are found wherever people are found. These are: (1) the lowlands near the Caribbean coast and up the Magdalena and Cauca valleys, regions that are tropical but so accessible that cattle can be profitably exported from them; (2) the high plateau upon which Bogotá is located, cool and healthy in climate, but too far from the sea to export cattle or meat; (3) the grassy plains of the Orinoco (the llanos), still less accessible. Much has been written regarding the great opportunities for cattle raising in the llanos. There may be opportunities for the future; there surely are not for the present, for the llanos of Colombia are too remote from either the coast or the interior markets to permit the profitable sale of cattle or meat. Only hides reach the outer world from the cattle ranches of the Colombian llanos, and hides from all parts of Colombia form the second largest item of export, although their annual value is only about 3 million dollars against 40 to 50 millions for coffee exports.

FOREST PRODUCTS

Forests cover the greater part of Colombia, although they are practically absent from the llanos of the upper Orinoco. About half the land area of the country carries forests of value. The lowlands are mainly forested, and the forests contain a great variety of trees that yield commercial products. Some 25 of these products are separately enumerated in the export lists of Colombia, but their total annual value reaches less than 2 million dollars. The forests yield a large variety of medicinal products, balsams, gums, resins, waxes, dyes, and nuts; yet the difficulties of obtaining them from the dense and unhealthy forests, and of delivering them to the sea coast are so great that comparatively little is done. Quinine (*Cinchona* bark) and rubber, once important in the forests of southeastern Colombia and exported to the value of many million dollars a year, are now produced so much more cheaply in the plantations of the Far East that the South American production is unimportant. Tagua nuts, from which vegetable ivory is made, are abundant

and are exported in considerable quantities (10 to 15 million pounds a year). Chicle, used in the making of chewing gum, is systematically gathered and has been exported to the extent of nearly 2 million pounds in a single year. Small quantities of mahogany and cedar are shipped abroad, but much more lumber is imported than is exported. As a group, the forest products of Colombia are unimportant so far as external trade is concerned.

TWO LEADING DEPARTMENTS

The Department of Antioquia.—Two departments or states of Colombia stand out in especial prominence: (1) Antioquia, containing the city of Medellín; and (2) Cundinamarca in which is located the capital, Bogotá. With the exception of the political prestige which attaches to the department that contains the capital city, Antioquia may be considered the leading department of Colombia. It lies in the heart of the mountainous district west of the Magdalena at an average elevation of nearly 5,000 feet, an altitude which provides a stimulating temperature. Whether or not the inhabitants of Antioquia are descended in part from Jewish ancestors, as they are reported to be, they do possess an energy, a business shrewdness, a desire for education and for financial advancement of an order that is unusual in tropical lands. Agriculturally, the department is of only average quality, but in its mineral wealth, especially in the output of gold, it leads the nation. It has between 30 and 40 cities of 10,000 people or more, and its principal city, Medellín, has an enterprising population of nearly 100,000. It has upward of 40 good-sized manufacturing establishments and easily leads all of the departments in this particular. The majority of the factories are in Medellín and its suburbs. So large is the private wealth of the business men, and so well are the finances of the department administered that the credit of Antioquia is as good as that of the nation. Illiteracy, which characterizes over 80 per cent of the Colombian population as a whole, is relatively low in Antioquia, and in Medellín more than four-fifths of the factory workmen can read and write. Families are large, and the increasing population is constantly overflowing into neighboring regions, where they are none too cordially received because of their pushing and money-making qualities.

The location of the department in the interior makes Antioquia dependent upon the undependable transportation of the Magdalena River up to the river port of Puerto Berrio; thence, trade follows the railroad westward to the central cordillera, and on to Medellin. Here, as elsewhere in Colombia, economic progress waits upon means of transportation, which, in turn, is extremely expensive in a country of tropical jungles and towering mountains. The problem is rendered still more difficult by the limited capital of the country as a whole. The Antioquia Railway is the most prosperous one in Colombia and is gradually extending its line out of profits—a rare thing in South America. It is commonly said that the future progress of Colombia rests more with the people of Antioquia than with any other group in the country.

The Department of Cundinamarca is only one-third the size of Antioquia, but it has about the same population—nearly 1 million. The most populous and productive part of the department is the high tableland of Bogotá. This level-topped plateau, 50 by 300 miles in extent and 8,000 to 9,000 feet above the sea, is fertile, moderately cool but monotonous in climate, and well supplied with rainfall. The tableland is practically all devoted to cultivation or pasturage, is dotted with towns and hamlets, and constitutes one of the few places in Colombia where the white man cares to make his permanent home, and where there is a large stretch of level, agricultural land. Bogotá, the political, intellectual, and social center of the republic, is one of the oldest settlements in Colombia. The city (elevation 8,650 feet) is semi-modern, with electric lights, telephones, street cars, a few paved streets, a large distributing business, a number of good-sized factories, and a large number of cultured people, mainly of Spanish descent. While lacking the business aggressiveness of Medellin, it is the center of a fairly energetic population. The Indians of the plateau are more numerous than the whites and constitute the laboring class. Half the people are literate; the National University at Bogotá (founded in 1572) has from 700 to 1,000 students.

Cundinamarca and its neighboring provinces constitute one of the leading coffee districts of Colombia, but the difficulty and cost of sending the crop to the coast is a most serious drawback. This cost is not uncommonly from five to ten times as great as the ocean freight rate to the United States.

TRANSPORTATION

THE MAGDALENA RIVER

Character of the River.—The Magdalena is upwards of 1,000 miles in length. It is the principal thoroughfare of the country, and the majority of Colombia's railways are built to connect with it. Slow and uncertain as the navigation of the river is, it does provide a means of reaching the interior and the capital. Nowhere else in the New World is a national capital placed in a part of the country that is so difficult of access. Mexico City, La Paz, Caracas, and Quito are all reached by railways connect-

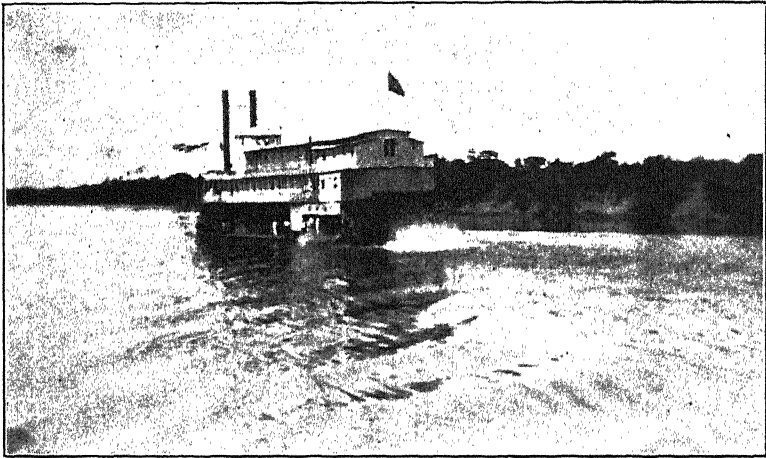


FIG. 16.—Stern-wheel steamer on the Magdalena River, the chief transportation route of Colombia, but a poor one. (Copyright Ewing Galloway, N. Y.)

ing directly with the sea coast. Undoubtedly, the Magdalena has greatly assisted in carrying the elements of European civilization far into Colombia, and it keeps the remote interior in touch with the outside world. On the other hand, it is probable that this poor but usable means of communication has prevented the construction of a better one. The mouth of the Magdalena is a swampy delta with ever-shifting distributaries which only small native boats can navigate. The river port nearest the sea is Barranquilla, 10 miles up from the mouth, and connected by a short railroad with Puerto Colombia, its sea port, 17 miles away.

The lower 70 miles of the Magdalena (above the delta) is a broad, strong river, a mile wide at high water, and navigable at all times of the year. Farther up, the river shrinks to a shallow,

bar-clogged stream, in the dry season (December to April). The larger river steamers ascend 615 miles to a stretch of rapids around which a narrow-gage railway transfers passengers and freight. Above this point, smaller steamers navigate the river to Girardot where the railway to Bogotá begins. For a hundred miles farther up stream, navigation by small boats is carried on, giving a total navigable length of over 900 miles, about equal to the length of the Ohio River.



FIG. 17.—Portion of the river port of Barranquilla near the mouth of the Magdalena. A large part of the provisions for the city is brought in by small boats. (Copyright Ewing Galloway, N. Y.)

Travel and Transport by the Magdalena Route.—So accustomed are the people of the United States and Europe to rapid and convenient railroad transport that the kind of service obtainable by the Magdalena route may be of interest. So vital to the economic life of any country are its means of transportation that an understanding of these is one of the very best ways of appreciating the progress or backwardness of a country. When one understands the uncertainties, delays, and high cost of transportation on the chief commercial thoroughfare of Colombia, he sees one reason why the country is still in a backward state.

Let us assume that a consignment of hardware is shipped from New York to Bogotá. The goods are (1) unloaded from the

ocean steamship at Puerto Colombia, and later are (2) loaded upon a freight car and taken 17 miles to the river dock in Barranquilla and there (3) unloaded. In the course of time, the goods are (4) placed on board a river steamer, and if this does not run aground on one of the many sand bars, it will eventually reach the lower end of the rapids at La Dorada. Here, the freight must again be (5) unloaded and (6) transferred to a railway which hauls it around the rapids, where it must be (7) taken from the train and (8) loaded upon a smaller river steamer. After a slow journey up the river, the freight is (9) unloaded from the river boat at Girardot and (10) loaded on the train that starts it toward Bogotá. About halfway to that city, the gage of the railway changes, and all freight is again (11) unloaded and (12) reloaded upon another train which finally (13) delivers it in Bogotá. Thus, after the consignment reached the ocean port in Colombia, it was six times loaded and seven times unloaded—thirteen times in all—in going a distance of 800 miles. If the goods are of average value, the cost is doubled, for the freight and handling charges are about equal to the invoice value of the goods, probably around \$75 a ton, which is several times the cost of ocean transportation from New York. Goods may be from 4 to 6 months in transit between Bogotá and the sea, although the trip may be made in 3 weeks. It costs \$70 to send a ton of wheat from Bogotá to the coast and \$60 to send a ton of coffee. This is ten times the all-rail rate on wheat from Chicago to New York, about the same distance. Under the very best conditions, passengers from the coast may reach Bogotá in $7\frac{1}{2}$ days.¹

Between the harbor of Cartagena and the Magdalena River, a waterway known as the Dique Canal—partly natural and partly artificial—which has been unused for a long period is being dredged to a depth of 12 feet. When completed, this will give water connection between the sea and the Magdalena River at Calamar.

When the coffee crop is moving toward the sea for export, the transportation facilities are wholly inadequate, and a serious congestion occurs. This may delay the delivery of coffee for 3 to 5 months. It is to be remembered that the foregoing conditions exist on the best organized of the traffic routes of the

¹ Soon after the World War, a Colombian-German Company established an airplane service between Barranquilla and Girardot, the Magdalena River terminal of the railroad to Bogotá, covering the distance in 7 hours.

country. In the regions far away from railway or navigable river, conditions are still worse, and the movement of products must be done on mule back or possibly on ox carts. The question may arise, Why do the people not live nearer the coast? Why did they place their capital and chief city so far in the interior? And the answer lies in the single word *climate*.

The Cauca River, the principal tributary of the Magdalena, has two navigable sections. Shallow-draft steamers, drawing 3 feet or less, can ascend the Cauca 74 miles, and its tributary, the Nechi, about the same distance, thus reaching one of the richest placer gold-mining regions of the country. In fact, these mines are well developed because they are reached by navigable water. The San Jorge, a tributary of the Magdalena along which placer mining is also active, is navigable for 112 miles at high water. Farther up stream, from Cali nearly to Cartago, the Cauca is navigable by small steamers half the year.

The Atrato River, fed by the almost incessant rains of western Colombia, is a large river but is badly obstructed by sand bars. It heads in the principal region of the platinum mines and is regularly used for navigation.

Several other small rivers are somewhat used for navigation by shallow-draft steamers; for even these shallow, uncertain streams may be a cheaper means of moving products and goods than moving them on mule back. Colombia is in much the same condition with respect to river navigation that the eastern half of the United States was between 1810 and 1830, before the railroad era began.

Roads and Trails.—Transportation on mules over mountain trails is the means most commonly employed in Colombia. Roads for wheeled vehicles are very few indeed, are in detached stretches, and are exceedingly costly to build and maintain. There are some 5,000 miles of national highways partially built, or actually completed; but scarcely any of this mileage is modern, hard-surfaced road, for this costs too much for a country as poor in revenues as Colombia. Good roads are among the most pressing needs of the country, but the mountainous topography, the swollen rivers, and the tropical downpours all combine to retard their construction, and funds are always scanty. Upwards of fifty national roads are authorized, but only two or three of them are long enough to be of much use. Experience shows that in this rugged country it costs as much to build a

modern, hard-surfaced road as it does to build a narrow-gage railroad, and that it costs more to maintain it. Public funds are both wasted and misappropriated in the local road-building projects, which are usually mixed with questionable politics. Appropriations are made year after year, but there are meager results to show for them. For a long time to come, the construction of improved trails must be the principal reliance for overland transport in this large, thinly populated, mountainous country. The Department of Caldas, one of the most progressive departments, has somewhat more than 1,000 miles of public trails. The area of the department is about equal to that of Massachusetts which has 19,000 miles of public roads.

A few sections of automobile road exist in the vicinity of large cities, but the entire country has a smaller mileage than is found in single townships in the United States.

Railways.—In its small railway mileage, as in many other matters, Colombia is the victim of a tropical climate, difficult land surface, a long period of civil wars, and bad politics. The first railroad was not started until 1874, nearly a half-century after the beginnings in North America. In the entire country, there are less than 1,000 miles of railway, divided among 16 companies; the longest one is about 200 miles in length. Three different gages are used, but most of the lines have a gage of either 3 feet or of 1 meter (3.28 feet). Most of the lines have cost so much that there is little possibility of their paying a profit beyond cost of operation, maintenance, and interest. In nearly all cases, the government has assisted in financing the lines either by subsidies or by guaranteeing interest on the bonds. Many of the lines are badly located and poorly built and must be, in part, relocated and rebuilt before they can efficiently serve the regions which they traverse. There is no railway system; there are only short lines to the coast or to the Magdalena River (Fig. 12). Most of the lines have never been completed, and two or three never ought to be, for they are unwisely placed. In Colombia, as in many other countries, local politicians and local organizations demand that "something be done for them," and thus ill-advised projects are undertaken and remain unfinished.

One vital need is that as much of the country as possible be freed from dependence upon the Magdalena River, whose sand bars, windings, fluctuations of depth from season to season, and

general undependability make the commerce that uses it not only slow but almost non-existent for months at a time. Yet, both of the leading cities, Bogotá and Medellín, and the important departments in which they lie are almost wholly dependent upon this river for their connection with the outside world. Both of these regions need direct rail connection with the Pacific coast, probably at Buenaventura. However, this needed connection will be a long time in accomplishment because of the enormous cost arising from difficult geographical conditions and political methods of handling public funds. Of the 25 million dollar indemnity paid to Colombia by the United States in settlement of claims arising from the secession of Panama from Colombia, about 20 millions were set aside for railway construction.

MANUFACTURES AND COMMERCE

Manufacturing Industries.—Colombia, like all of South America, is still in the agricultural stage of economic development. Manufacturing with power-driven machinery has barely begun. Manufacturing of the modern factory type calls for large capital, for technical and managerial leadership, for skilled labor, for good transportation facilities, for abundant power (coal, oil, or hydroelectric power), and for a consuming population that is large enough and wealthy enough to make large-scale production feasible. A new country like Colombia must necessarily grow into manufacturing gradually, and that is what is going on in all of the Latin American countries. With the aid of a high protective tariff on imported manufactures, small manufacturing establishments are undertaken, often with the assistance of persons who have acquired a knowledge of the industry abroad. The earliest industries attempted are those which use local raw materials, and whose products are needed in the immediate vicinity, such as sugar, soap, tobacco, coarse textiles, and flour. Later, more complex industries are attempted, such as the manufacture of shoes, iron and steel working, and glass making.

In 1915, Colombia was officially reported to have 121 manufacturing establishments with a total investment of about 12 million dollars. Ten of the largest factories accounted for half of the 12 million dollar capital; and one foreign-owned oil refinery represented one-tenth of the total invested capital. In the years that followed 1915, there was a considerable gain in manufactur-

ing. Textile making, both cotton and woolen, is the leading branch of industry, cotton mills being especially centered at Medellín and Barranquilla. The principal flour mills are in Barranquilla and Bogotá. The largest sugar mill is near Cartagena and has a capital of 2 million dollars, a very large capitalization for an enterprise in Colombia. The four leading (but small) iron-working plants are in the vicinity of Medellín. In 1920, the department of Antioquia had about \$4,300,000 invested in 40 manufacturing plants. North of Bogotá are eight government-owned salt mines, whose product (a government monopoly) is refined nearby. In southern Colombia, the Indians make large numbers of Panama hats. Brick and tiles are made in a number of places, including the Cauca Valley, where a plant turns out many varieties of hollow tile and building brick. The only large oil refinery (United States owned) is on the Mag-

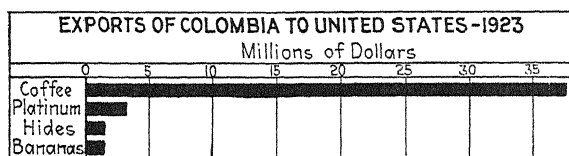


FIG. 18.

dalena River and supplies practically all of the petroleum products used in the country.

Encouraging as are the foregoing facts, it remains true that Colombia is a long way from supplying even its own modest needs of manufactured goods, and such goods will long continue to be the chief imports of the country.

Character and Growth of Foreign Commerce.—It is to be remembered that in most matters of development, Colombia and many other Latin American countries have been so delayed that they are now in the stage through which western Europe and the eastern United States passed a half-century ago. In 1870, the external commerce of all nations averaged about \$8 per capita of the world's total population. That of the United States was about \$21 per capita of its population. At present, the foreign trade of Colombia averages about \$17 per capita of its population. It will be seen that, considering its stage of development, Colombia's foreign trade is above the world average of 1870 and nearly as large as that of the United States in a corresponding stage of progress. In all comparisons of conditions in the majority of

Latin American countries with those in the United States, the later and slower development of these countries must be taken into account.

Since the close of the World War, the foreign trade of Colombia has averaged about 100 million dollars a year, which is only a little less than the foreign trade of the United States when its population was the same as that of the present Colombia.

With the exception of one year, Colombia has, for a long period, kept the value of her exports well in excess of her imports, thus giving a favorable balance of trade. The predominance of agriculture in the life of the country comes out in the fact that about four-fifths of the value of the exports is creditable to prod-

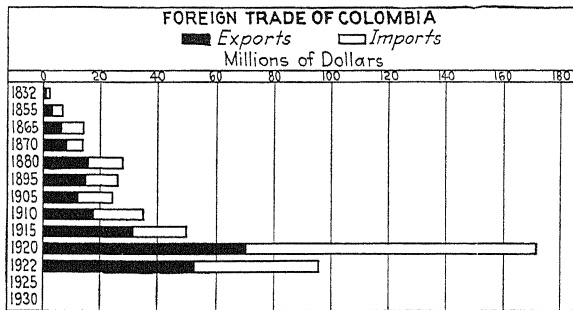


FIG. 19.

ucts of the land, coffee yielding a larger value than all other exports combined. Animals and animal products (mainly hides) make up only 5 per cent and mineral products 18 per cent of the exports. A very large percentage of the foreign trade of Colombia (approximately 65 per cent) goes to the United States. Two groups of imports, namely, textiles and metal products, make up one-half of the imports of Colombia. The rise in the value of the foreign trade of the country is noteworthy, as may be seen from Figure 19.

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CHAPTER III

VENEZUELA AND THE GUIANA COLONIES

VENEZUELA

Influence of the Country's Turbulent Past.—During 300 years of Spanish rule, Venezuela was neglected by the mother country because it did not yield sufficiently the coveted gold and silver which was the main interest of the conquerors. This colony was the first in South America to raise the standard of revolt against Spain (1810), and declared its independence in 1811. Throughout the next ten years—mainly under the leadership of Simon Bolivar—the people fought for freedom and finally gained it. From 1821 to 1830, Venezuela was united with Colombia and Ecuador, but withdrew from the union in the latter year. From 1820 to 1910, the country was the scene of a succession of armed uprisings, revolutions, and dictatorships. New constitutions and revisions of constitutions followed one another, until the present is the eighth in number. Under such conditions, a country can make but slow progress. The revenues of Venezuela went to armies instead of to schools. Its property was destroyed, its credit ruined, and its people killed. Next to Paraguay, it has suffered more from wars than any other South American country. Under the most forceful of the dictators, however, progress was made. It is believed that the population of the country is little, if any, larger today than it was in 1811, when independence was declared. Immigration into the country barely equals emigration; yet Venezuela needs immigrants badly. Foreign investors have naturally been slow to enter a country that has been the victim of so much disorder and misrule. The country needs foreign capital to aid in the building of railroads, port improvements, and public utilities, and in developing its agricultural and mineral resources. Venezuela has but one post office to 10,000 population as compared with four in Argentina and seven in Uruguay. There are only $1\frac{1}{2}$ miles of railway to 1,000 square miles of territory as against 22 in Argentina and 23

in Uruguay. Its national revenues are about 15 million dollars a year, or \$6 per capita of its population, as compared with \$24 per capita in Uruguay and \$20 in Chile. A part of this difference in stage of progress shown by the tropical land of Venezuela, on one hand, and the cooler lands of Chile, Argentina, and Uruguay, on the other, is chargeable to climatic differences; but much of it

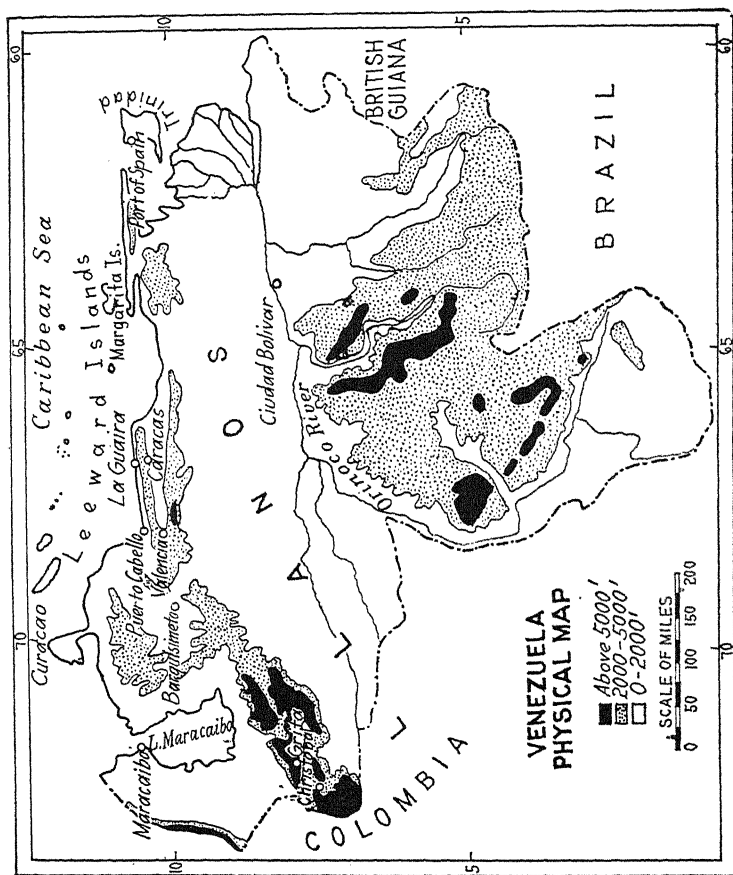


Fig. 20.—Map showing highlands and lowlands of Venezuela. (Altitudes according to Good.)

is also chargeable to the disorder and dictatorships of the past. Possibly they, too, may be due more largely to climate than appears on the surface. At any rate, Venezuela has suffered immeasurably from political ills, and until recently has scarcely had an opportunity to work out in peace her most pressing economic problems.

Adjustment of Economic Life to Land Surface and Climate.—

The geographical location of Venezuela is excellent for commerce with the West Indies and with the United States, and favorable for commerce with Europe. Climatically, however, that situation imposes upon the country all the handicaps of continuous heat and of tropical diseases which its people are not yet able to combat. The great preponderance of non-whites in the population (at least 10 to 1) is, to a degree, the outgrowth of the selective action of climate. Fortunately, the cool trade winds, which blow from the sea most of the year, combined with a considerable area of high land, give a white man's climate to a part of the northern section of the country (Fig. 20).

There are four distinct physiographic provinces: (1) *the Guiana highland*, occupying half of the country, nearly uninhabited, and only partially explored; (2) *the llanos* or great plains of the Orinoco, steaming hot and partially flooded during the rainy half of the year, and browned to a crisp during the dry season; (3) *the mountains* of the west and north, occupying a small fraction of the country, but containing the greater part of the white people, wealth, and industries; (4) *the low plains* around Lake Maracaibo, torrid and unhealthy, but rich in petroleum, and capable of producing tropical products abundantly.

The Guiana highland needs little comment. It is a mountainous, forest-clad plateau with peaks rising above 8,000 feet. Its rugged surface, dense forests, interior location, and tropical heat have effectively kept people out, and the region yields almost nothing of commercial importance except a limited amount of gold. It is believed that this ancient mountain mass may contain large mineral wealth, but under present conditions, little of it could be mined at a profit.

Character of the Llanos.—These plains are 600 by 200 miles in extent. They reach far into Colombia, but the Venezuelan portion occupies a third of the area of the country. They are traversed by the navigable Orinoco and its largest branches. Good-sized steamships ascend 230 miles to Ciudad Bolivar, the only city of importance on the Orinoco (Fig. 20). Smaller river steamers carry on an intermittent and uncertain traffic on the main river above Ciudad Bolivar and on a few of the tributaries.

Much the greater portion of the llanos is low and flat. During the wet season (May to October), it is covered with grass, but the

lower portions are under water. During the dry season (December to March), the grass dies, the smaller streams dry up, and the cattle must seek pasturage on the slightly wetter portions or in the foothills a long way off. Omitting a few small cities, there is not an average of one person to the square mile throughout this plain, once the seat of a great cattle industry, but now relatively unimportant in this respect. If this fertile plain existed in a region of favorable temperature and rainfall, it would be another Argentine pampa.

The mountainous region of the north and west is relatively small in area, but it is the one part of Venezuela where white people can live and retain some of their vigor. The highest lands exceed 15,000 feet in elevation, but the parts that are thickly populated and well tilled lie at elevations of 1,500 to 5,000 feet. This is the coffee region, and coffee is the chief crop of the country (Fig. 21). These uplands contain half of the principal cities, including Caracas, the capital, 9 miles back from the sea and more than 3,000 feet above it; also Valencia, agricultural center and third city in size. If Venezuela is to be developed by her own people, the energy and enterprise must come from this highland section.

The Lake Maracaibo plain is low, hot, and unhealthy; but its position, enclosing a large but shallow arm of the sea, gives it moderate advantages for shipping and makes it the sea gate for much of the productive coffee land and other agricultural land lying to the south and east. It is the principal sugar-growing region of Venezuela, one of the chief cacao regions, and the most immediately promising petroleum field in South America. The city of Maracaibo is the first in Venezuela in foreign commerce and second in population. The hot climate makes it difficult to secure a sufficient supply of labor to maintain the sugar, cacao, and petroleum industries already well established.

Limited Area Suited to Occupation by White People.—The most productive parts of Venezuela, including the capital and most of the leading cities, lie relatively near the coast, and commercial products reach the sea much more easily than do those of Colombia. Railway building is less expensive than it is in Colombia. Yet, on the whole, the higher altitudes and cooler temperatures of Colombia are reflected in a more vigorous economic life and in more rapid progress in that country. Unless

the Guiana highland shall sometime prove attractive to people of European descent, Venezuela has only a small area suited to white occupation in which to build up a nation. Colombia has much the larger area suited to coffee, the chief crop of both countries. The future of the llanos is discussed briefly in connection with the cattle industry.

The Coast Line and Harbors.—For purposes of commerce, the coast of Venezuela is neither particularly favorable nor

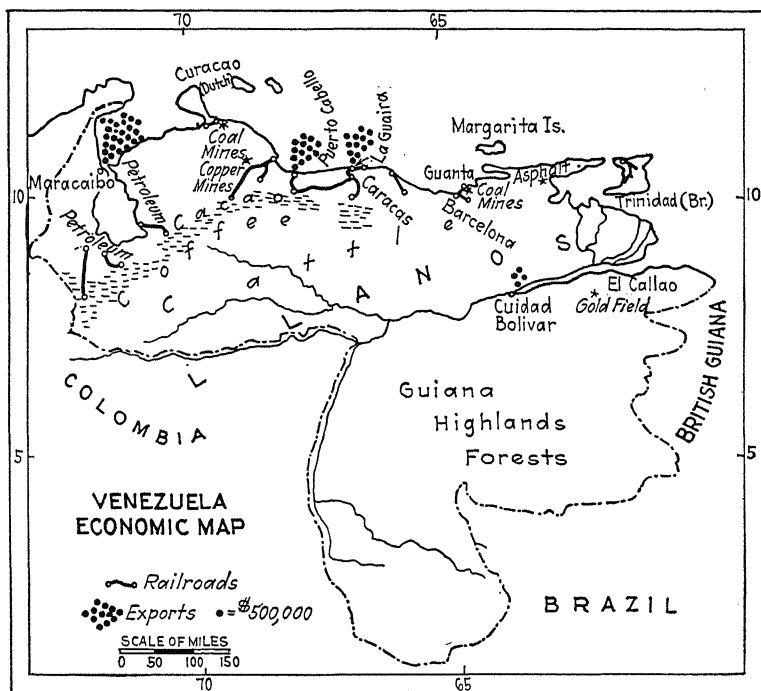


FIG. 21.—Map showing the principal producing regions of Venezuela.

particularly unfavorable. With all its windings, it has a length of approximately 1,800 miles, furnishing four natural gateways into the interior. There are 32 harbors, of which five are called first class, as Venezuelan harbors go. The four natural gateways are (Fig. 21): (1) the navigable mouths of the Orinoco through which the southern llanos are most conveniently reached; (2) the low gap between the two coast ranges, where the interior plain reaches the sea in the region of Barcelona and the port of Guanta, one of the best in Venezuela, though its commerce is

not large; (3) the valley that slopes down to the sea at Puerto Cabello, and whose upper end leads back into the agricultural lands around Valencia. The importance of the last-named gateway has been diminished by the rise of the port of La Guaira, served by the railway and automobile road to Caracas, which is also connected by rail with the Valencia district; (4) the large opening afforded by the Lake of Maracaibo, with the important port of Maracaibo near its entrance.

La Guaira (population 10,000), the principal gateway for the imports of Venezuela, has no natural harbor but is partially protected by a 2,000-foot breakwater. Ships of 28-foot draft may load and unload directly at the piers. The port has regular steamship connection with New York, New Orleans, and several European countries.

Maracaibo (population 50,000), is on the west side of the entrance to the Lake of Maracaibo. Although the water is shallow and the port equipment deficient, Maracaibo is the chief port of shipment of Venezuela. A large part of its exports are transhipped to larger vessels at the Dutch Island of Curaçao, not far away. Not only is Maracaibo an important port for the petroleum and coffee shipments of its hinterland, but it also receives and ships large quantities of coffee from the Cucuta district of Colombia.

Puerto Cabello is called the best natural harbor of Venezuela. The depth of the water is sufficient for the largest ships that call at these ports, and the protection from the sea is good. In foreign commerce, the port ranks third, following La Guaira and Maracaibo.

MINERAL RESOURCES AND MINERAL PRODUCTION

Small Gold Output.—Venezuela has one gold-mining region of importance. It lies in the edge of the Guiana highland about 200 miles southeast of Ciudad Bolivar, and not far from the boundary of British Guiana. It is the famous El Callao district which has produced half of the gold yielded by Venezuela in the last 50 years (Fig. 21). At one time, El Callao was said to be the most profitable gold mining district in the world and paid fabulous dividends. Some ten or twelve mines are still operating in that region and the total output is about a million dollars a year. The Callao mining region is reached by a difficult

ox-cart road involving a journey of several days from the Orinoco River.

Copper has been mined in small quantities in Venezuela since the early Spanish days, and before that time, by the Indians. At present, only one property is producing on any considerable scale; it is located at Aroa near the northern coast (Fig. 21) and ships its ore to the United States for treatment.

Asphalt occurs in various places in Venezuela where the residue of petroleum seepages accumulates at the surface, but the most important is the Bermudez pitch lake. This is located in the extreme northeastern part of the country not far from the Island of Trinidad, which contains a still more important lake of asphalt (Fig. 21). The Bermudez pitch lake covers 1,100 acres but is shallow. An American company controls the property and ships 40,000 or 50,000 tons of asphalt yearly.

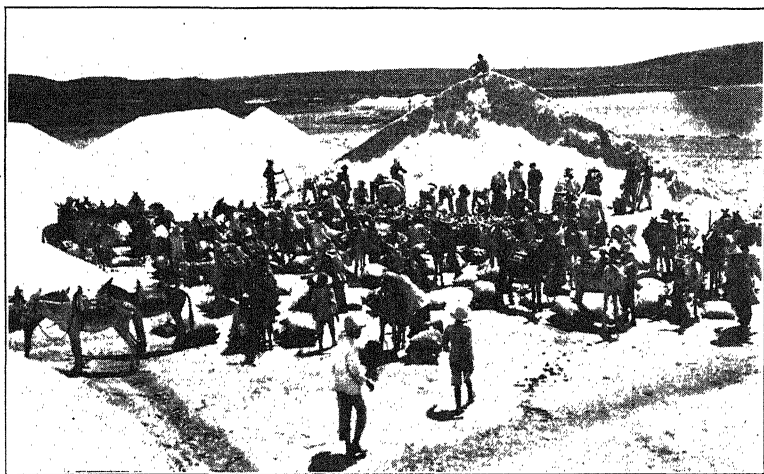


FIG. 22.—Huge piles of salt obtained from deposits on the coast of Venezuela at Araya. The salt is transported to markets on the backs of mules. (*Copyright Ewing Galloway, N. Y.*)

Petroleum.—In the years following 1923, an oil boom developed in the vicinity of Lake Maracaibo. One well yielded 150,000 barrels a day; others, 50,000 to 60,000 barrels. By 1927, the output had risen to 64 million barrels and was rapidly increasing. Venezuela thus became the leading oil producer in South America. Operations are hindered by the tropical conditions, the shortage of labor, and the difficulty of transportation. Only shallow-draft tankers can enter Lake Maracaibo. On the Island of

Curacao, the Dutch have a modern oil refinery, and one has been built at San Lorenzo on the shore of Lake Maracaibo. Petroleum is now the chief mineral product and export of Venezuela.

Coal is mined in small quantities in government-owned mines in Venezuela. Mining methods are primitive and inefficient, and the total output is unimportant (about 25,000 tons a year). The coal is low-grade sub-bituminous and lignite, and easily crumbles to powder. The coal-mining industry is small, but the resources are such as to promise a sufficient supply for the limited requirements of the country in the future (Fig. 21).

Iron ore of good quality exists in several places and has been mined from time to time, but usually at a financial loss. Venezuela has not yet reached an industrial stage of development and has not the coking coal or railway transportation necessary for an iron and steel industry.

Taken as a whole, the mineral industries of Venezuela, with the exception of petroleum are of little importance, and the mineral resources are comparatively unknown.

The Pearl Fisheries and the Magnesite Deposits of Margarita Island.—North of eastern Venezuela is a group of islands of which Margarita is the largest (Fig. 21). The 40,000 people of the islands are supported mainly by the fishing industries. At one time, pearl fishing in these waters was an important and profitable industry, but a disease attacked the oysters and the industry dwindled, though it still continues. On the Island of Margarita are extensive deposits of magnesite, a mineral from which a large variety of magnesia compounds are made; but the output is small and the industry is not prosperous.

AGRICULTURE

Agricultural Land and Crops.—The area of land that is suited to profitable crop production in Venezuela can be only roughly estimated. At present, none of the Guiana highland and almost none of the llanos are devoted to crops other than the small patches used to produce food for the scanty native population. Such cultivation as exists in Venezuela is mainly confined to the coastal lowlands and to the mountain valleys and gentler slopes of the north and west. In all, this is less than 1 per cent of the total land of the country, or, 1 million acres, equal to 4 per cent of the improved farm land of Illinois. Though agriculture is the chief occupation of the people, it is said that only one-fifth of the population is regularly engaged in it. Nearly all of the export

crops are grown in the extreme north and northwest, and consist mainly of coffee, cacao, and small quantities of sugar, cotton, corn, tobacco, and coconut products. Only the first two are of present importance, though sugar exportation is increasing. The chief food crops are corn, beans, and rice, but comparatively little of the rice is grown in the country.

Methods of Cultivation.—For the most part, methods of cultivation except on a limited number of large estates, are antiquated. Modern farming machinery or even modern tools are practically unknown to 90 per cent of the workers. Plowing is little more than scratching the surface of the ground, and cultivation means scarcely more than chopping down the largest weeds. In the Valencia region, some of the large estates use tractors and modern machinery. By 1920, 50 American tractors were in use in Venezuela. The better coffee plantations of Brazil annually yield from 1 to 2 pounds of marketable coffee per tree, while those of Venezuela yield around $\frac{1}{2}$ pound and the poorer ones only $\frac{1}{4}$ pound.

Cuba and Venezuela Contrasted.—The agricultural land of Venezuela exceeds in area that of Cuba, and the population is about the same; yet Cuba exports yearly from \$100 to \$200 of agricultural products per capita, and Venezuela \$8 to \$15. Doubtless, Cuba has a somewhat better climate, better soil, and better geographical situation, but these did not avail much until Cuba was able, through stable government, to attract capital and energy for the building of railroads, sugar mills, and docks. Venezuela has not yet been able to do this to any extent, and can do it only as internal political conditions promise protection to investments and thus invite interests that can develop the resources of the country.

Investments in Agriculture.—An official survey of the agricultural wealth of Venezuela was made some years ago¹ and gave the following as the sums invested in the production of five leading crops:

	BOLIVARES	EQUIVALENT IN U. S. MONEY
Coffee.....	80,000,000	\$16,000,000
Cacao.....	62,000,000	12,400,000
Sugar cane.....	57,000,000	11,400,000
Tobacco.....	10,000,000	2,000,000
Cotton.....	1,000,000	200,000

¹ BELL, P. L. *A Commercial and Industrial Handbook of Venezuela*, p. 64, U. S. Dept. of Com., 1922.

If an equal investment in the production of the remaining crops and live stock is assumed, then Venezuela has approximately 84 million dollars invested in agriculture, the principal industry of the country. The full significance of this comes out when it is realized that there are hundreds of individual counties in the United States in any one of which the value of farm property exceeds the total investment in agriculture in Venezuela, a country which has nine times the area of a state like Ohio. Several causes contribute to this backward condition: (1) the small proportion of land that is well suited to agriculture; (2) the indifferent methods of cultivation practiced by all but a few; (3) the lack of agricultural or even general education; (4) the lack of energetic and intelligent farm labor; (5) the general contentment of the masses with a mere living on a very low plane; (6) the serious disorganization of all industries in the past, due to frequent revolutions and bad government.

Porto Rico and Venezuela Contrasted.—The little island of Porto Rico annually exports and imports about four times as much in value as does Venezuela. The annual production of the principal crop of Porto Rico (sugar) increased from about 5 million dollars in 1901 to 80 million 20 years later. During the same period, the principal crop of Venezuela (coffee) rose from 7 million to 13 million dollars. These comparisons are not to be viewed as an unfriendly criticism of the people of Venezuela, but rather as an evidence of the unfortunate political and educational conditions imposed upon the country by warring leaders and fostered by conditions growing out of a tropical climate. Under constructive leadership, it is evident from the cases of Cuba and Porto Rico that even a tropical climate need not prevent remarkable progress.

Coffee, the Principal Crop.—Venezuela ranks third (following Brazil and Colombia) in the production of coffee. This crop is peculiarly suited to tropical highlands and does well on slopes that are too steep for ordinary crops. Coffee trees give a fair yield with little labor, but yield much better if the weeds and undergrowth are kept out and the ground is cultivated and fertilized, as is done on the better plantations of Brazil. In Venezuela, only a minimum of cultivation is given, and the crop is correspondingly light. The quality, however, is excellent, although not all of the coffee-growing sections yield coffee of the same quality. Because of fine flavor and aroma, the coffee from the

region of Merida, south of Lake Maracaibo, brings the highest price; but all of the Maracaibo coffees bring higher than the average prices, and higher than Brazilian coffees bring.

Among the 25,000 coffee farms and plantations, there are both small and large holdings; one of the largest covers 50,000 acres, although not all of this land is devoted to coffee. It is estimated that Venezuela has about 250 million coffee trees, and that the average yield is from 85 million to 100 million pounds a year, or about 6 or 7 per cent as much as the Brazilian crop. Nearly all of the coffee is exported, and half of it goes to the United States. The annual value of the coffee shipments

EXPORTS FROM VENEZUELA TO UNITED STATES
TWO YEAR AVERAGE, 1923-24

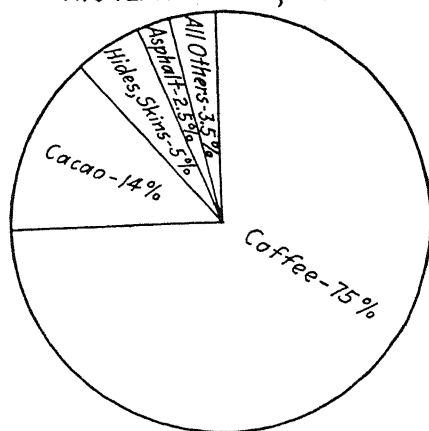


FIG. 23.

nearly equals that of all other exports combined, excepting petroleum; yet it is not a large sum—about 15 million or 20 million dollars a year. The mountainous nature of the coffee country makes railroad building difficult and expensive, and the railway facilities are wholly inadequate. Railway freight rates are so high that mule trains and carts actively compete with the few railway lines in transporting coffee. The average charge for hauling freight on Venezuelan railroads is upwards of 25 cents a ton-mile, while in the United States, it is between 1 and 2 cents. It costs from 4 to 6 cents a pound to ship coffee from the interior plantations to the exporting points on the coast. At times in the past, the green coffee has sold in New York for

9 or 10 cents a pound after paying 6 or 7 cents a pound for transportation and handling charges. Under such conditions, the coffee grower got almost nothing for his crop. However, prices have been above 20 cents a pound for considerable periods, and these have yielded excellent profits to the grower. If modern methods, such as are employed by the most successful planters in Brazil, were employed in Venezuela, and adequate railway facilities were available, Venezuela could triple its production of coffee. This assumes that sufficient labor could be secured, and such an assumption may not be justified, for Venezuela is decidedly short of agricultural labor. The attractions of town life are as strong there as elsewhere.

Cacao, the Second Agricultural Export.—Cacao is an American plant, unknown to Europeans until the discovery of the New World. When mature, the cacao tree is the size of a cherry tree and bears 50 to 100 pods at a time. The cacao pods, as large as short, fat cucumbers and containing 30 to 40 seeds the

VENEZUELA - INVESTMENT IN AGRICULTURAL PROPERTIES - YEAR OF 1924

Coffee-\$18,000,000	Cacao-\$13,000,000	Sugar-\$11,000,000	Tobacco-\$2,000,000	All Others \$6,000,000
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FIG. 24.

size of almond meats, grow from the trunk and larger limbs of the tree, not from the twigs. The trees should be planted in places sheltered from strong winds and shaded by taller trees. It is distinctly a tropical plant, requiring a continuously high temperature and plenty of rainfall. As a rule, the trees grow on lower ground than the coffee trees. Two hundred trees can be planted to the acre. At 5 or 6 years of age, they begin to bear and continue for 40 years or more unless a disease attacks them, and diseases are more or less of a menace. There are two principal picking seasons—June and December—in Venezuela. Some skill and care are required in the picking, fermenting, and curing processes, and when dried, the seeds cannot be stored long in a damp climate without deterioration. The seeds consist of many substances, but over half of the weight of the seed is oil. When roasted and ground, a bitter brown powder is produced. If cocoa for drinking is to be made, a large part of the

oil (cocoa butter) is removed. If chocolate is to be made, the oil is left, and for sweet chocolate, sugar and flavoring are added.

Approximately 50 million pounds of cacao beans are produced in an average year in Venezuela. There are some 5,000 cacao plantations, large and small, representing an investment of about \$12,400,000, and yielding an average of 5 million to 6 million dollars a year. The region around Caracas ships more cacao beans than any of the other districts. Venezuela does not rank high among the cacao-growing countries, being surpassed in production by Brazil and Ecuador in South America, and by British and Portuguese colonies in West Africa, notably by the Gold Coast (British), which in 1924 led the world in the exportation of this commodity (Fig. 33). The United States is the largest importer of cacao beans, and the value of chocolate and cocoa products manufactured in the United States exceeds the huge sum of 100 million dollars a year.

Sugar.—Venezuela has areas of lowland well suited to sugar cane. The principal region is the land surrounding Lake Maracaibo, and most of the modern sugar mills are located there, although there are less than 10 of them. Sugar, in the form of brown cakes called *papelon*, is made in small local mills in various parts of the country, and is generally used in this form by the working people. Sugar estates having 3,000 to 5,000 acres of cane exist, but estates of this size are unusual. As a rule, they are profitable only when raw sugar sells for at least 4 cents a pound. They are less efficiently managed than the plantations of Cuba and Porto Rico and cannot produce sugar so cheaply. The production of sugar reaches 60,000 tons a year, one-fourth to one-third of which is available for export. The little island of Porto Rico exports twenty times as much. Sugar production, like all other industries in Venezuela, suffers from the general backwardness of the country, including the lack of capital, industrial leaders, and transportation.

Other Crops.—The two most important food crops raised in the country are corn and beans, and along with rice, which is mostly imported, these constitute the principal food of the working classes. Small quantities of corn, beans, cotton, and tobacco are also exported.

The Cattle Industry.—The statement is frequently made that the 120,000 square miles of the llanos form one of the great cattle ranges of the world, capable of sustaining millions of cattle.

If this were true, some explanation must be found for the small numbers of cattle on the llanos, and for the marked diminution in numbers at present as compared with 1883 when there were four times as many as there are now, or with 1899 when there were three times as many.¹

Reliable statistics are lacking; yet there is reason for believing that there are fewer cattle on the llanos now than there were in the Spanish colonial days. Undoubtedly, the many civil wars in Venezuela have been one reason for the wide fluctuation in the number of cattle from time to time. Undoubtedly, too, the active personal interest of the dictator-presidents, Guzmán

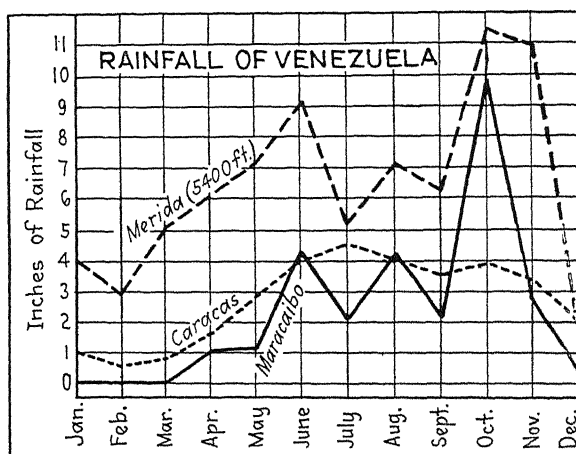


FIG. 25.

Blanco and Curpo, in cattle raising explains the largely increased number of cattle on the llanos between 1883 and 1900. But the later dictator-president Gómez, the richest cattle man in Venezuela, did not succeed in stimulating the cattle industry to any large degree, and the British meat-packing plant in Puerto Cabello has been constantly handicapped by the lack of cattle. In view of these facts, this question arises, After all, are the natural conditions actually favorable for cattle raising on the llanos? The chief fact is that the llanos do offer a very extensive tract of level grass land unsuited to agriculture and better suited to grazing than to anything else. But this is not saying that

¹ See *Venezuela, an Economic Report*, p. 88, issued in 1921 by Georgetown University, Washington, D.C.

experience has proved the llanos well suited to cattle. The drawbacks are these:

1. In the wet season, the lower lands are flooded for several months, the area of grazing land is much reduced, and cattle must travel long distances to secure food and have difficulty in finding it.

2. In the dry season, the coarse bunch grass becomes hard, dry, and unnutritious; the cattle lose weight and become an easy victim to pests and diseases which thrive in the tropics.

3. Cattle from the llanos must be driven long distances to market—100 to 400 miles. In the dry season, pasturage and water along the route are scanty, and cattle become thin and poor.

4. The high temperatures, the insect pests, and the danger of cattle diseases prevent any large production of high-grade beef cattle, such as the American and British markets demand.

5. Before they are fit to slaughter or to ship, the cattle must be conditioned in pastures near the coast or city markets, and few cattle men have or can afford such pastures in those localities. President Gomez and his friends control them and thus virtually control the beef-cattle industry of the country. When the Venezuelan Meat Products Company (British), after investing 5 million dollars, purchased holding pastures near the outlet of the llanos, this purchase was declared void by the Gomez government and the purchase money was ordered returned.¹

Considering all the handicaps, it does not seem that the cattle industry of the llanos is an inviting field for foreign investment, or that the region holds very much promise as a future source of beef for the United States or Europe. However, cattle form one of the chief sources of wealth of Venezuela, and the wealthiest men of the country are the big cattle men. The exports of live cattle, meat, and hides amount to approximately 2 million dollars a year, and at times to twice this sum.

Other Live Stock.—The number of sheep, pigs, horses, and mules combined scarcely reaches a million. These animals are not healthy in an intensely tropical country. Goats are hardier and can feed on poor mountain pastures and dry land. They supply milk, meat, and valuable skins, and are peculiarly the animals of poor people and poor land. Venezuela has upwards of 2 million of these animals. Goat skins form a considerable

¹ BELL, P. L. *A Commercial and Industrial Handbook of Venezuela*, p. 110, U. S. Dept. of Com., 1922.

item in the export trade. Mules are used as pack animals, as they are throughout much of Latin America. Venezuela's 5 or 6 millions of live stock, contrasted with Iowa's 15 millions or Uruguay's 20 millions, show the low relative importance of the country in stock raising.

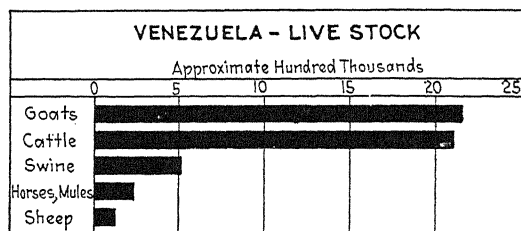


FIG. 26.

CONDITIONS OF TRANSPORTATION

Railways.—The ratio of a country's mileage of good roads and railroads to its area and population is one of the best indexes of its economic progress. Venezuela has 11 railways, mostly short and of several different gages. The total length is about 660 miles. In proportion to the area of the country, this is a small mileage. All of the railroads are in the northern part of the country, and most of them extend from the coast a short distance inland (Fig. 21). Five of the roads are owned by the Venezuelan government or by Venezuelan capital, and six by foreign companies, mostly British. All are narrow gage, varying from 2 to $3\frac{1}{2}$ feet in width. Most of the mileage was built between 1881 and 1894 and not much has been added since.

"On several of the main roads, traffic is lighter now than 25 years ago; and, notwithstanding the fact that rail transportation is as costly as that by pack mule, scarcely any of the railway enterprises have earned a fair return upon the capital invested, though certainly transportation has been quickened and rates have been steadied if not cheapened."¹

The unprofitableness of railways is due to the small movement of goods and products in a country that is thinly populated and is occupied by people of small productive energy and small purchasing power. In general, the railroads have been costly to build. The short line (22 miles) from La Guaira to Caracas

¹ HALSEY, F. M. Investments in Latin America, *Special Agents Series* 169, p. 375, U. S. Dept. of Com., 1918.

has 15 bridges and 8 tunnels, and ascends more than 4,000 feet in crossing the coast range. The principal line of the country, connecting Caracas with Valencia (114 miles) has 219 bridges and viaducts and cost \$135,000 a mile to construct. The Bolivar Railway has 518 bridges, large and small, in 144 miles.

"Five of the principal railways of Venezuela are practically paralleled by cart roads over which freight is transported in the common two-wheeled mule carts of the country, this traffic cutting heavily into the receipts of the roads."¹

In an ordinary year, the 11 roads carry about 350,000 tons of freight, an average of only 90 tons a day for each railway, or one freight train of nine cars.

Highways.—Up to 1908, when President Gomez began his highway-improvement campaign, Venezuela had scarcely any highways except mule trails and a few poor cart roads. In recent years, about 60 per cent of the money used for public works has gone to road improvements. Several of the larger cities are now connected by roads over which automobiles can travel, although these are not to be thought of as similar to automobile roads in the United States or Europe. In a period of 12 years, 1,700 miles of roads were constructed or reconstructed, and the work is still going on. In addition, the main pack trails are being repaired to act as feeders for the highways. Only a small section of the country has yet benefited from these improvements, but it is the most densely peopled and fully developed section—the coffee- and cacao-growing region. Under the vigorous leadership of a strong man—dictator though the President actually is—Venezuela has done more for road improvement than most of the countries of South America.

Forest Products of Relatively Small Present Importance.—About 40 per cent of the land area of Venezuela is forested. Nearly all of the Guiana highland is forest covered, but very little is known of the potential value of this region. It is now occupied by a few half-savage Indian tribes, and some of it has never been seen by a white man. In the days of active rubber gathering, the small Venezuelan portion of the Amazon basin supplied 300 to 400 tons of crude rubber annually, but that industry has declined, partly because of the competition of

¹ BELL, P. L. *A Commercial and Industrial Handbook of Venezuela*, p. 338 U. S. Dept. of Com., 1922.

far-eastern plantation rubber and partly because the producing regions have been getting farther and farther inland and more expensive to reach. For example, "to reach the farthest outpost of the rubber industry on the upper river, parcels have to be carried in four different launches, twice on mule back, five times in dugout canoes, and eight times on men's backs."¹ A product of these forests, more important than ordinary rubber, is a species of gutta-percha known as *balata*.² The *balata* of commerce is a rubber-like gum made from the latex of a tree that grows throughout the tropical forests of South America. It

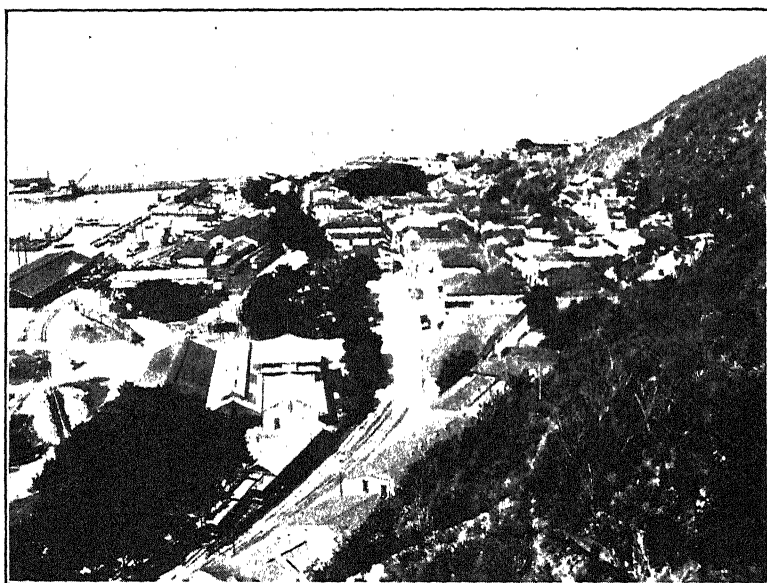


FIG. 27.—City of La Guaira, sea port for Caracas. A city of about 10,000 people. No natural harbor. (Copyright Ewing Galloway, N. Y.)

may be obtained from incisions made in the tree in the same way that the rubber latex is obtained, but the Indians frequently cut down the tree and thus end its life. Millions of fine trees have been thus destroyed, and the industry progressively ruined in the regions that have been exploited. Most of the Venezuelan *balata*—amounting at times to a million dollars a year—is

¹ BELL, P. L. *A Commercial and Industrial Handbook of Venezuela*, p. 311, U. S. Dept. of Com., 1922.

² *Balata* is employed, among other uses, in making rubber belting and golf-ball covers, and insulating electric wires.

collected at Ciudad Bolivar and exported from that city. Moderate quantities of chicle are also gathered and exported. The mangrove is abundant in the delta of the Orinoco and along much of the coast. Its bark supplies a tanning extract which is exported to a small extent. Very little lumber from native forests is used or exported. Wood is used for fuel, charcoal, and fences. The total value of forest products exported from Venezuela rarely reaches 2 million dollars a year.

MANUFACTURES AND COMMERCE

Venezuela in the First Stage of Manufacturing.—Manufacturing industries have made only a beginning in Venezuela. A number of cotton mills of small capacity operate in the chief cities—Caracas, Valencia, and Maracaibo. They import foreign yarns and also use some native cotton. They supply about half of the coarse cotton goods used in the country. Tobacco and cigarette factories of considerable size, using native leaf, supply most of the demand for these products.

As already mentioned, more than enough raw sugar and papelon are made to take care of the modest requirements of the country. Three good-sized breweries in three cities provide a large part of the malt liquors. President Gomez has a large creamery at Naricual which supplies much of the butter, cream, and condensed milk for Caracas and Valencia. Two small paper mills make wrapping paper. Several tanneries provide a part of the coarse leather required, but shoes are mostly made by hand or with the aid of simple machinery in small shops. There are other small, miscellaneous factories making cordage, glassware, soap, matches, chocolate, and furniture. Practically all of the foregoing products are of the commoner sort. The better manufactures are imported.

Foreign Commerce Small and Increasing Slowly.—In the exceptional year of 1920, the total foreign trade of Venezuela reached 92 million dollars, but dropped to half that sum the following year. An approximate average is 50 million dollars a year, with exports slightly higher than imports. This gives a per capita foreign trade of scarcely \$20 a year, a very low figure.

Mainly due to its nearness, the United States supplies about half of the foreign products purchased by Venezuela, and buys fully half of that country's exports. Coffee constitutes about one-half of the value of all exports. The imports are, of course,



FIG. 28.—Caracas, chief city and capital of Venezuela, nine miles inland and over 3,000 feet above the sea. (Copyright Ewing Galloway, N. Y.)

mainly manufactured goods of many kinds, but notably iron and steel products and textiles, two of the most fundamental imports by most young countries. The population and the purchasing power of Venezuela increase very slowly.

An American¹ who is familiar with Venezuela thus summarizes conditions in that country:

"All this fair country is owned by General Juan B. Gomez. To be sure, General Gomez does not have the actual title to all its estates, but his will is absolute and he may confiscate what he wishes at any time. He gained Venezuela, like the feudal barons of old, because he was and is the strongest man in it . . .

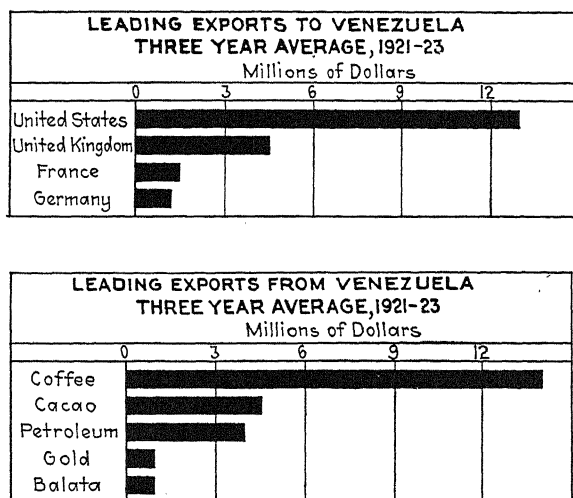


FIG. 29.

"Under the present administration, the people of Venezuela are better off than they have ever been before. On this account, Gomez is generally respected and admired by his retainers. One of the general's hobbies, which he preaches constantly, is that every one must work—and in a real "mañana" country such an idea is revolutionary

"Venezuela, though constitutionally and formally a republic, is actually as much an absolute monarchy as Russia ever was. The power of General Gomez is complete, and with this condition the virtues and evils inherent in absolutism obtain . . .

"Culturally, Venezuela is, of course, rather backward when compared with more progressive nations . . . There are a few good

¹ PEARSE, PROF. A. S. Feudal Times in Venezuela, *The Scientific Monthly*, July, 1919, pp. 83-90.

doctors, lawyers, and teachers. The great mass of the people, however, are rather illiterate, and the elementary schools are largely in the hands of the church. Domestic arrangements are usually rather primitive and often unsanitary, even in the cities. Cooking is done over charcoal fires on the ground, or on an earth-covered table in the kitchen; the smoke being allowed to escape through holes in the wall. Most of the houses are made of clay with tile or thatched roofs . . ."

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THE GUIANA COLONIES

Throughout a large part of the colonial period in America, British, French, and Dutch ships preyed upon Spanish vessels

which were engaged in trade with the Spanish colonies, and fleets belonging to these powers repeatedly attacked Spanish and Portuguese colonies. In that period, Spain and Portugal controlled virtually all of South America, while the British and French controlled nothing on the mainland. The Dutch, however, gained a foothold in Guiana, and as the outcome of three centuries of struggle, Spain and Portugal now hold no possessions in South America, but their old enemies—Great Britain, Netherlands, and France—have three small tropical colonies which nobody covets—British Guiana, Dutch Guiana, and French Guiana.

BRITISH GUIANA

The Colony.—Portions of the Guiana colonies passed back and forth from British to Dutch and Dutch to British several times during the colonizing period. The present colony of British Guiana was ceded to the British by Holland in 1803. In point of size, the colony is actually larger than England and Scotland combined, but it has fewer people than the little island of Jamaica. It is the most sparsely populated of all the British colonies in America. The capital, Georgetown, has a population of 55,000.

Of the 300,000 people in the colony, about 95 per cent are negroes and Asiatics, or persons of mixed races. There is a considerable group of Portuguese, and about 4,000 other persons of European stock. The Indian aborigines are declining in numbers; only a few thousand remain in the interior. The negroes are descended from African slaves who were brought to the New World to supply labor for the tropical plantations, and who were freed in British Guiana in 1834. The Asiatics are in part descendants of Chinese laborers who were imported prior to 1867; but most of them are East Indians or Hindus who were brought in as indentured laborers. In the hot and sultry climate, they are inefficient and lacking in physical stamina. Tropical maladies are common, for there is widespread apathy in regard to sanitary conditions.

Half of the colony is lowland, partly forest covered and partly savanna or grass land. Only a narrow strip, 5 or 6 miles wide along the coast and river banks, is under cultivation. This does not total over 200,000 acres or about three-tenths of 1 per cent

of the land of the colony. An Englishman, writing of the cultivable land of British Guiana says:

"It was they (the Dutch) who rendered it possible for us (the British) to utilize these amazingly fertile lowlands which form the sugar-producing portions of the colony. 'Every acre has been the scene of a struggle with the sea in front and the floods behind'; and the whole system of embankments, canals, and sluices to which we owe the safety from inundation, and the possibility of cultivating our coast and river-side lands is due to Dutch skill, industry, and perseverance."¹

Between 1917 and 1922, the colony expended $4\frac{1}{2}$ million dollars on the maintenance of the works necessary to protect the low agricultural lands from inundation. In the interior are rugged mountains belonging to the Guiana highland already referred to in connection with Venezuela. There are dense forests containing many species of trees of commercial value, but like all of the tropical forests of South America, they are yielding only a few commercial products, the chief of which is balata, gathered only under government license. More than 4,000 laborers are at times engaged in collecting this substance.

It is the lament of the English that the colony is unable to attract the capital and labor essential to its development, but the colony makes little progress. It is an interesting fact that the Island of Trinidad, a British colony not far from Guiana, having only one-fiftieth as much land, actually has a greater production. There are a few short narrow-gage railroads with a total length of about 100 miles; also 300 miles of fair or good roads, and nearly 500 miles of inland navigable waters.

The Commercial Products.—Great Britain has always encouraged the raising of sugar cane in her tropical colonies. Sugar is the chief crop of British Guiana, occupying a third of the land under cultivation. It yields 100,000 tons of sugar a year, which is more than Venezuela produces. Next in importance is rice, whose cultivation greatly increased after the East Indian laborers were brought in; for they use rice as the chief item in their diet. The sugar estates, of which there are about 50, are scarcely able to produce sugar at the low prices which the great modern plantations in Cuba and Porto Rico find reasonably profitable.

At one time gold mining, chiefly from placer deposits, was an industry of some importance; but later, when diamonds were

¹ CHALMERS, SIR DAVID. *British Guiana, Scot. Geog. Mag.*, vol. 12, p. 126, 1896.

discovered, the gold miners turned diamond hunters and met with considerable success. In 1923, for example, the exportation of diamonds reached a value of 5 million dollars. They constituted the second most valuable article of export and placed Guiana ahead of Brazil and second only to South Africa in diamond production for that year.

Another mineral product of some importance is bauxite, the principal ore of aluminum, which is mined by a progressive American company which sends the ore to East St. Louis for treatment.



FIG. 30.—The principal rice-growing sections of South America are the coast belts of northern Peru, of British and Dutch Guiana and of southern Brazil. (*Map by Pan American Union.*)

The total exports of the colony attain the modest sum of 25 million dollars a year, but when computed on the basis of population, they give British Guiana three times as great a per capita value of exports as Venezuela has. Three-fourths of the exports go to the British Isles and Canada, and only a small part to the United States. Imports also come mainly from Great Britain.

On the whole, British Guiana, with its monotonously hot climate, its colored population, and its inability to attract immigrants or to maintain a sufficient supply of labor, is making slow progress, and its future does not seem encouraging.

DUTCH GUIANA

In the settlement of one of the many wars of the seventeenth century, Holland gave up New Amsterdam (New York) to the English in exchange for the colony of Dutch Guiana. At that date (1667), tropical colonies were more highly valued than those in colder climates, and South America was considered more promising than North America. New York is now the metropolis of the New World, and Surinam or Dutch Guiana is an almost forgotten spot somewhere on the coast of South America. Its area (58,000 square miles) would make four countries the size of Holland. Its 115,000 people are mainly negroes, Asiatics, and half-castes; there are less than 2,000 whites. A few tribes of uncivilized Indians occupy the interior. The capital, Paramaribo, has a population of 50,000 people.

Cultivation is confined to reclaimed lands and other lowlands lying near the sea and a short distance up the rivers. In all, only 50,000 or 60,000 acres are devoted to crops, no one of which is produced in any quantity. Sugar leads the list, followed by cacao and coffee. The forests, like those of other tropical lowlands in South America, supply balata, and a few mines are still worked for small quantities of gold. This colony, of which much was once expected, has proved to have no attraction for colonists and is nearly at a standstill in economic development.

Holland has a small but commercially important island, Curaçao, off the coast of Venezuela. It is a leading port of call for steamships, and is one of the principal transshipping points in the Caribbean.

FRENCH GUIANA

French Guiana is the least important of the three Guiana colonies. Of its 32,000 square miles of land, only 12 or 14 square miles are under cultivation. The capital, Cayenne, has a mixed population of 14,000. A part of the colony is used as a penal settlement for habitual criminals sent from France. Its products are similar to those of the other two colonies, but French Guiana provides little for export.

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CHAPTER IV

ECUADOR

The Past.—In the Spanish colonial period, the region now occupied by Ecuador was the Presidencia of Quito, somewhat larger in extent than the present republic. After a long struggle, extending from 1809 to 1820, Quito obtained its independence from Spain and joined New Granada and Venezuela in forming the first republic of Colombia. But Ecuador (like Venezuela) withdrew from the union in 1830 and formed the republic of the Equator, which is the significance of the word Ecuador. Wars with both Peru and Colombia followed, and Ecuador yielded some of the territory which it had claimed. Boundary disputes with all of its neighbors arose. The dispute with Colombia has been adjusted in so far as it concerns these two countries, but a large area in the unsettled and scarcely explored eastern section is still in dispute among the three countries (Fig. 4).

The neutral observer cannot escape the feeling that the secession of Ecuador from Colombia and her decision to attempt a separate national existence were based upon sentiment more than upon reason. There was an historical but not a geographical basis for this action; for there had been a separate Presidencia of Quito during the colonial period, and this gave a basis for the nationalistic aspirations of its people. The nation has been formed, and now has a right to continue, though small, poor, and struggling. Once having been a nation, its people could not persuade themselves to be anything less. But this "sovereign nation" has to exist on revenues that would scarcely maintain a medium-sized American city.¹ Since the country became independent, it has shared the experiences of most of its sister republics, namely, frequent revolutions or attempted revolutions, considerable bloodshed, very little immigration, little money for education or for public improvements, difficulties with its creditors, and retarded progress; yet there has been progress.

¹ The total national revenues of Ecuador are about 10 million dollars a year, less than those of Indianapolis, for example.

Geographical Regions of the Country.—Ecuador has three major physical provinces: (1) the hot, sultry coastal plain, which forms about 5 per cent of the country's total area of 120,000 square miles and which includes the very productive lands around the Gulf of Guayaquil; (2) two lofty ranges of the Andes, and the great valley between them; (3) the eastern heavily forested slopes and plains of the Amazon basin. The Andes are very high in Ecuador and have no less than 22 great volcanic peaks, partly active and partly quiescent, attaining heights exceeding 3 miles. Between the two nearly parallel ranges is a valley, 300 miles in length and 20 to 30 miles in width, divided by cross-ranges into

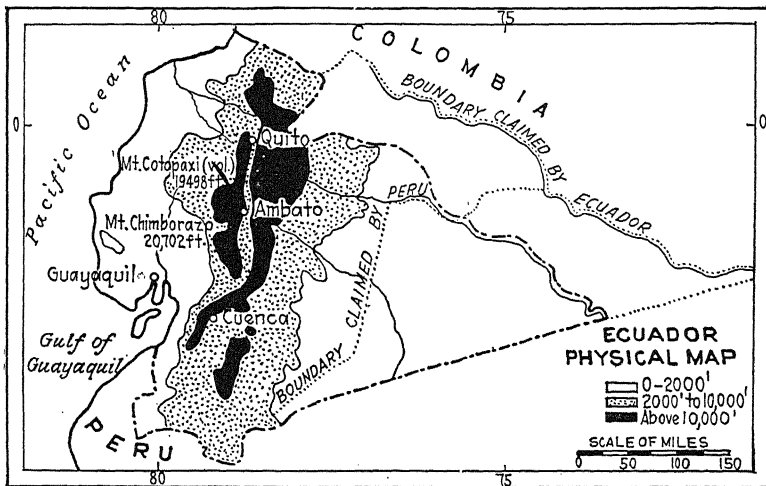


FIG. 31.—Map showing the highlands and lowlands of Ecuador. (Altitudes according to Goode.)

three basins of which the basin of Quito in the north is the most populous and most productive. These intermontane basins lie at altitudes exceeding 8,000 feet; that of Quito has an altitude of 9,375 feet. The Quito basin has ample rain for agriculture and a mild temperature throughout the year. Bordering the Gulf of Guayaquil and its main river, the Guayas, are low plains, in places reaching a width of 50 miles. These plains produce the rice and most of the cacao of Ecuador, and supply the greater part of the exports of the country.

The Gulf of Guayaquil, 140 miles broad and reaching 100 miles inland, is the largest indentation on the west coast of South America. A short distance up the Guayas River is the only

important port of the country, the city of Guayaquil with a population of almost 100,000.

The cordillera is so massive, so lofty, and so difficult to cross, that it constitutes a formidable barrier between the coast lands of the west and the montaña of the east, and relatively few of the people of Ecuador have seen both sides. No railroad or highway crosses both ranges, and there is little intercourse between the eastern and western parts of the country.

Andine Trails.—Throughout the whole 2,500 miles of the tropical Andes, there are only occasional stretches of roads suitable for wheeled vehicles. For the most part, travel and transportation are carried on by mules or llamas over trails which have existed for hundreds of years, and which connect towns and settlements, as main highways do in the United States. The trails are merely narrow paths that wind and zigzag along a valley or up the face of a slope, working their difficult way up one valley to a pass in the range, and then similarly down into the next valley, soon to begin another ascent. In the wet season, the trails are slippery and dangerous and are likely to become a sort of earth ladder of humps and hollows, as the feet of the mules wear deep holes in the muddy path. Often the trail follows a narrow shelf worn in the sheer face of the mountain, with a yawning chasm below and a frowning wall above. From time to time, a mule loses his footing and plunges down the precipice, carrying his load with him.

The carrying of goods and passengers is a regular occupation of a class known as *arrieros*, usually mestizos or Indians who have more or less standardized prices over the established trails. They compete actively with the railroad where one exists, and a mule train may be seen carrying bags and bundles along a trail parallel to the railway, and doing so at the same rate as the railway charges. In fact, in Ecuador the *arrieros* insist upon using the railroad as a trail and drive their mule trains along the right of way. In parts of the more mountainous sections where population is very sparse and only small quantities of products seek an outside market, the mule train is the most economical means of transport, better fitted to the environment than either vehicles or railroads. But when the tonnage of goods to be moved rises to any considerable quantity, the mule train is, of course, inadequate. Assuming the average mule load to be 200 pounds and the distance covered to be 25 miles a day, the mule's

achievement is $2\frac{1}{2}$ ton-miles a day. A light freight train of 15 cars, carrying an average of 8 tons to the car, will cover, even in the mountainous sections, an average of 70 miles, or 8,400 ton-miles a day, equivalent to the work of 3,300 mules.

A Small Railway Mileage.—Ecuador has about 425 miles of railroads, of which 290 miles are included in the line completed in 1908, extending from Duran, across the river from Guayaquil, to Quito. This principal railway of the country was a long time in building and was finally carried to completion by an energetic American engineer. Financially, the road has been a failure, and its first mortgage bonds have sold as low as 30 cents on the dollar. Traffic is very light and earnings correspondingly small. Passenger trains do not run during the night and require

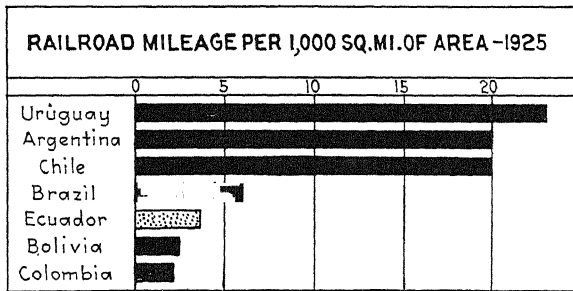


FIG. 32.

2 days to make the 290-mile trip between Duran and Quito. The road, however, is a genuine benefit to Ecuador and has helped to quicken the economic life of the country.

The engineering difficulties involved in constructing this railroad may be judged from the following account:

“About 58 miles from Guayaquil, the climb into the sierra begins, and the trains from this point are shorter and are handled by heavier locomotives. The railway after a short climb enters the Chan-Chan Valley, which is followed along a route laid out under great engineering difficulties. The curves on this section are extremely wide and numerous, and the grade reaches $4\frac{1}{2}$ per cent. The railway, in a general way, is laid out along the route of a torrential river, which is crossed and recrossed at various points. At an approximate altitude of 4,000 feet, the city of Huigra is reached; from this point, a rugged, broken country is entered, and wonderful engineering feats had to be performed in making the climb up the Andine slopes. Along this section of the railway is located the Devil’s Nose, where the line enters a deep

gorge. In this gorge, the line comes to an abrupt end, and the trains have to be backed up over a switch along a ledge blasted out of the face of the precipice. By this means, a higher ledge is reached and forward progress is again possible. The Alausi Loop, at an altitude of 8,553 feet, is another splendid engineering feat. The road then climbs to the Palmira Pass, 10,600 feet above the sea. Then there is a slight descent to Riobamba, one of the largest towns in Ecuador, located at an altitude of 9,020 feet. There is another heavy climb from that place to the Chimborazo Pass, the altitude of 11,841 feet being the highest point reached on the entire line. The railway then drops to Ambato, 8,435 feet, located in the center of a well-cultivated district, reclimbs to the base of Mount Cotopaxi, 11,653 feet, and enters the Machachi Valley, reaching Quito at 9,375 feet elevation."¹

In addition to the line from Duran to Quito, there are six short railroads which are being slowly extended as funds are available. Their total length is approximately 135 miles (Fig. 42).

The following illustration of the enthusiasm with which a temperamental people are likely to begin a great public undertaking, and the slow progress which it may make afterward is found in the history of the Ambato to Curaray Railway, a government project. In 1904, the president of the republic authorized the railroad to be built at once and secured from the United States nine experienced engineers, who came to Ecuador to make the surveys and select the route. In 1906, construction was begun but was soon discontinued. In 1912, 8 years after the authorization of the railroad, the actual inauguration of the work took place. Here is the way it began, as seriously described by the American engineer in charge:

"At 1 p. m., the municipal council met formally and designated the main street leading to the station as Calle Luis A. Martinez, in honorable remembrance of the great patriot of that name, who died in November, 1909, and whose unselfish and patriotic zeal kept alive the enthusiasm for many years and made the final success of the project assured.

"At 2 p. m., the governor of the Province of Tungurahua, Dr. Naranjo, with the council, Minister Penaherrera, representing the Government, Senor Gomez Delatorre, representing the junta, followed by the engineers, 500 school children carrying construction tools decorated with flowers, citizens of Ambato and the Carchi Battalion, marched to the beginning of the line, where Dr. Penaherrera turned over the first spade-

¹ HALSEY, F. M. Investments in Latin America and the British West Indies, *Special Agents Series* 169, pp. 285-286, U. S. Dept. of Com., 1918

ful and where many speeches were made. A reception was afterwards held at the council rooms where refreshments were served. Later, the directors, Messrs. Moore and Fox, held a reception at their headquarters where there were more refreshments, and the festivities wound up with a grand public ball which lasted well into the next day. Souvenirs in the form of parchment "Recuerdos" and silver medals suspended by ribbons of the national colors were struck off by the council. The next morning, the serious work of construction commenced with 210 laborers."

In 1924, 20 years after its official authorization and 12 years after the ceremonious beginning which is described above, 25 of the 72 miles between Ambato and the Curaray River had been completed, an average progress of about 2 miles a year. Nor is this an exceptional case.

Known Mineral Resources Small.—Unlike its neighbors on the north and south, Ecuador is not an important producer of minerals. Some interest has developed in the oil fields of western Ecuador, but the output of oil is not large, scarcely one-tenth as great as that of the oil fields of Peru across the boundary. It is a unique fact that a part of the oil is obtained by digging open pits or wells to a depth as great as 100 feet. Into these wells, small quantities of oil seep and are dipped out from time to time. Such wells may yield from a few gallons to several barrels a day. There is one gold-mining region, Zaruma, that produces rather steadily a half-million dollars' worth of gold yearly. It lies in the southern part of the country, back in the mountains away from any railroad, and the ore must be carried 40 miles by mules. This region has produced gold since early Spanish days. Beds of low-grade coal have been located in several places, but no actual mining on a commercial scale is in progress. The inferior quality of the coal, the great cost of mining it in out-of-the-way mountain valleys, and the absence of suitable transportation all combine to discourage mining operations. Very little is known of the possible resources of coal or other minerals, and mineral production is less than in any other Andine country.

CACAO CULTIVATION

Rank among Cacao-producing Regions.—At one time, Ecuador was the world's leading producer of cacao, but it no longer holds that rank. In 1911, for example, the production of the leading regions of the world was as follows:¹

¹Cacao Production and Trade, *Special Consular Report* 2,650, U. S. Dept. of Com., 1912.

Ecuador.....	89,000,000 pounds
Brazil.....	86,000,000 pounds
Gold Coast (Africa).....	77,000,000 pounds
San Thome and Principe.....	74,000,000 pounds
Trinidad.....	53,000,000 pounds
Dominican Republic.....	44,000,000 pounds
World total.....	552,000,000 pounds

By 1920, the production of the Gold Coast exceeded 250 million pounds, while that of Ecuador was about one-third that quantity, Because of the shortage of labor and the rather haphazard

WORLD CACAO PRODUCTION
FIVE YEAR AVERAGE, 1920-24

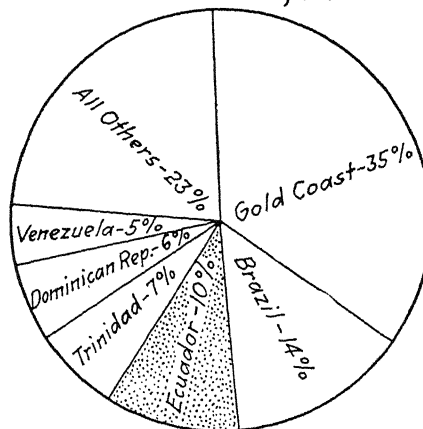


FIG. 33.

methods which are employed, it seems improbable that Ecuador will again attain a position of leadership. The production of cacao by decennial years has been as follows:

CACAO PRODUCTION IN ECUADOR

Date	Pounds	Date	Pounds
1840	14,500,000	1890	37,000,000
1850	11,500,000	1900	45,000,000
1860	17,000,000	1910	80,000,000
1870	24,500,000	1920	75,000,000
1880	37,000,000	1924	65,000,000 (partly estimated)

It will be noted that there was a continuous rise from 1850 to 1910, followed by a decline. The decline has been due both to

the inroads of disease among the trees and to uncertain prices following the financial depression of 1921.

The Cacao Plantations.—Cacao trees in limited numbers grow wild in the forests around the Gulf of Guayaquil, and a small quantity of cacao is produced merely by cutting away most of the other trees and giving the cacao trees a better opportunity. In some cases, cacao trees are planted in the forest. As a rule, however, plantations consist of trees that have grown from planted seeds. On the better-managed plantations, the trees are spaced 12 to 15 feet apart and average 200 trees or more to the acre. Other trees are commonly left to shade the cacao trees and to afford a certain amount of protection from the wind. Weeds

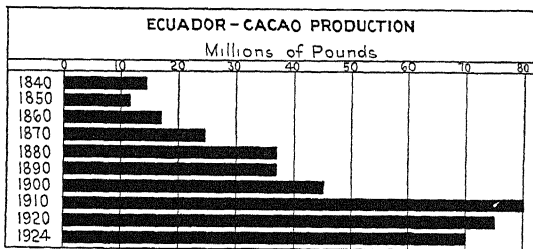


FIG. 34.

and undergrowth are chopped out from time to time, but commonly, no actual cultivation or fertilization is practiced. Deep, rich, damp soil is selected for the plantations, and the trees bear for 30 or 40 years or even more if not attacked by disease.

A minor quantity of cacao is produced by small planters, but large plantations are the rule, and the leading ones belong to foreign companies. The largest plantations are owned by German and British capital. Some estates have as many as 3 million trees, and plantations with 300,000 trees or thereabouts are not uncommon. A healthy, mature tree yields, on an average, 2 pounds of dry beans a year. Prices fluctuate very widely, but 12 cents a pound at Guayaquil may be taken as a fair mean. This would yield about \$50 an acre a year on the well-kept plantations and would give a net profit of 12 to 15 per cent on the investment. At times, the profit has greatly exceeded that figure, and doubtless at other times, it has been smaller.¹ Nearly

¹ *Special Agents Series* 169, p. 293, U. S. Dept. of Com., 1913.

all of the cacao estates are situated along the navigable waterways that traverse the plain north and east of the Gulf of Guayaquil. Canoes, rafts, launches, and shallow-draft steamboats bring the dried beans to Guayaquil where buyers sort, grade, and bag them for export.

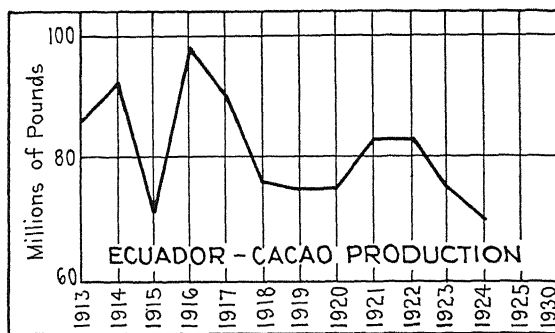


FIG. 35.—Diseases of the trees and the competition of other countries have brought a decline in cacao production in Ecuador, once the leading producer.

Importance of Cacao to Ecuador.—Ecuador is a one-crop country, so far as exports are concerned. The total value of the exports is not large, for the country is small, and less than 2 per cent of it is under cultivation. Of the 120,000 square miles included in Ecuador, about 700 square miles, or six-tenths of 1 per cent, are devoted to cacao; yet this small fraction of the land supplies 60 to 70 per cent of the value of the country's exports. The prosperity of the republic rests upon this crop, and anything which adversely affects the cacao industry, strikes at the financial life of the country. Such an economic condition is dangerous, particularly so when the one crop is so easily produced elsewhere, and danger of overproduction is always imminent. Ecuador's economic safety demands a larger diversification of crops and a corresponding decrease in dependence upon cacao. The tremendous crops that are being grown on the Guinea coast of Africa and in nearby islands coupled with the ease and cheapness with which cacao is produced there, threaten the life of the industry in tropical America, unless a more efficient system of production can be employed. The loss of the cinchona (quinine) industry of Peru and the decline of the rubber industry of the Amazon Valley are still fresh in memory.

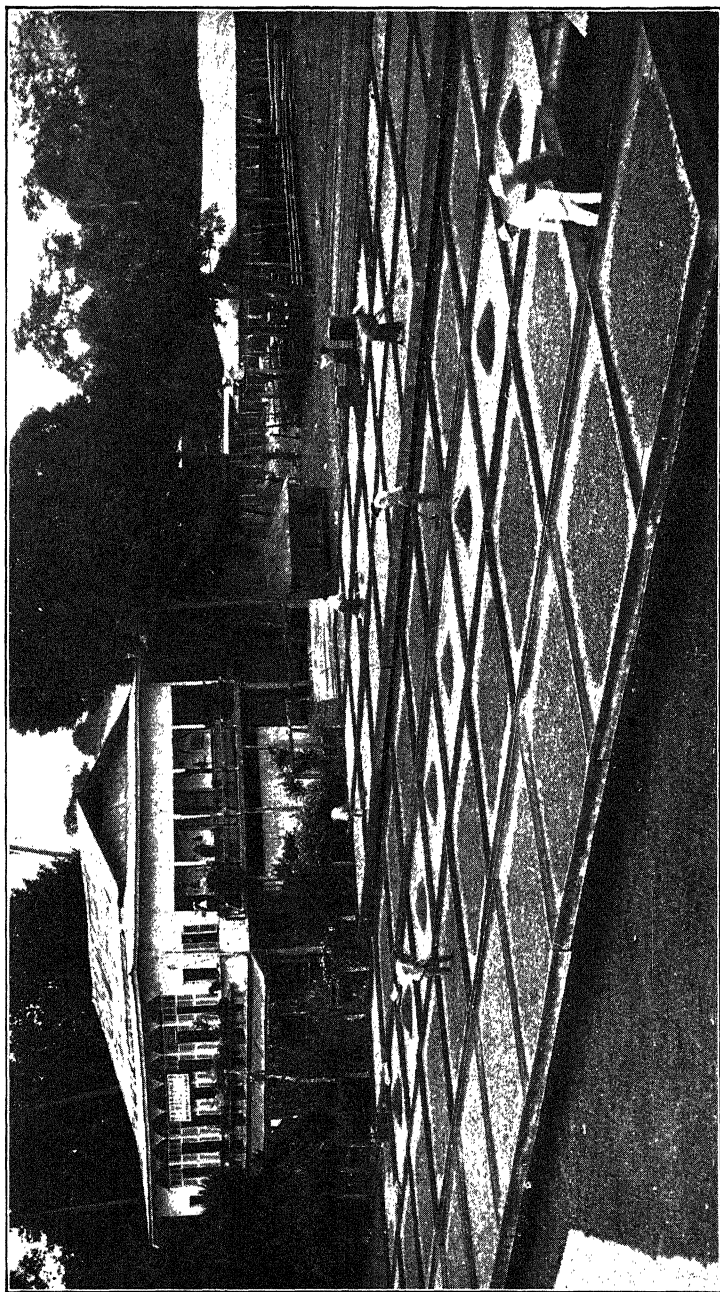


FIG. 36.—Modern equipment for drying cacao beans in Ecuador. The low, flat cars may be run under sheds at night or during a shower.
(Copyright Ewing Galloway, N. Y.)

OTHER COMMERCIAL PRODUCTS

Ivory Nuts.—In the tropical forests that skirt the Pacific coast from Central America to Ecuador grow several species of the tagua palm. This tree bears huge clusters of seeds as large as horsechestnuts, known in commerce as ivory nuts because the hard white kernel resembles ivory. Their chief use is in making “vegetable ivory” buttons. The mature nuts fall from the trees and are gathered by natives. The annual exportation from Ecuador averages about 40 million pounds, valued at 3 or 4 cents a pound at Ecuadorian ports. The United States is



FIG. 37.—An Indian farmer and his wife plowing with the wooden plow common in the tropical Andes. Modern farming implements are wholly unknown to most of the mountain Indians. (*Copyright Ewing Galloway, N. Y.*)

the largest buyer. These nuts are also exported in considerable quantities from Colombia.

Coffee is a minor product in Ecuador, although there are large areas of mountain slopes as well suited to its production as are those of the Caribbean countries in which coffee is the main crop.

Cattle and Hides.—Among the valleys and slopes of the Andes are many cattle ranches, the property of wealthy land owners who usually live in the cities, especially in Quito. Cattle raising might be a much larger and more profitable industry here, as it is in some Andine countries, if cattle and cattle products could be sent from the interior to the world's markets at

reasonable cost. At present, this is impossible, and the industry, therefore, does little more than supply local needs. The total exportation of animal products, including wool and hides, scarcely reaches a value of a million dollars a year, which is less than the value of the ivory nuts.

Miscellaneous Products.—Owing to the great range of altitude found in these Andine countries, crops of the temperate zone as well as of the tropics are grown. In the high mountain valleys, wheat, potatoes, corn, barley, and other food crops of the intermediate latitudes are cultivated, but they are used mainly in the immediate region of growth and so do not enter the channels of international trade. In the lowlands, sugar, cotton, tobacco, rice, and other crops of warm climates are grown, and small quantities are exported.

MANUFACTURES AND COMMERCE

Little Manufacturing.—A few years ago, the factory industries of Ecuador were represented by 1 shoe factory, 1 small oil

EXPORTS FROM ECUADOR—FIVE YEAR AVERAGE, 1920-24

Cacao—\$12,000,000	Ivory Nuts \$ 2,200,000	Straw Hats \$ 1,100,000	Coffee \$900,000 Gold Ore \$600,000 Cotton \$500,000	All Others \$1,700,000
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FIG. 38

refinery, 1 iron foundry, 3 tanneries, 4 soap factories, 6 small cotton and woolen mills, 7 flour mills, 11 breweries, 24 ice-making plants, and a few small saw mills, sugar mills, furniture factories, and chocolate and candy factories.¹ The increase in manufacturing is necessarily slow because of a lack of almost all the conditions which cause manufacturing to grow. Such manufactured goods as the people use are mainly imported, but the majority of the population, being Indians with a very small purchasing power, buy few imported goods. Hydroelectric power for lighting and manufacturing is in use, and upwards of 25 central hydroelectric stations have been erected. All of the larger towns and cities have electric lights.

Panama Hats.—There is one manufactured article for which Ecuador is justly famous, and that is the so-called Panama hat, given that name because most of the hats are shipped to Panama

¹ *Special Agents Series* 169, p. 293, U. S. Dept. of Com., 1918.

on their way to the United States and Europe. They have been made for centuries by the Indians, especially by natives of the region just north of the Gulf of Guayaquil, the finest hats coming from the towns of Jipijapa and Monte Cristi. The material comes from the broad leaves of a trunkless palm. Sometimes the fiber that is used is as fine as thread. Some of these hats have sold for \$150 each. Even the coarser hats usually sell in the United States for \$10 to \$25 each, although the patient Indian who laboriously weaves them may have received not more than a dollar or two. It is said that the better hats are woven only when the atmosphere is damp. Exportation of Panama hats from Ecuador has exceeded 40,000 dozen a year, but the quantity has fallen off recently.

Foreign Commerce Increasing Slowly.—A country that produces only a little more than the needs of its own people can have

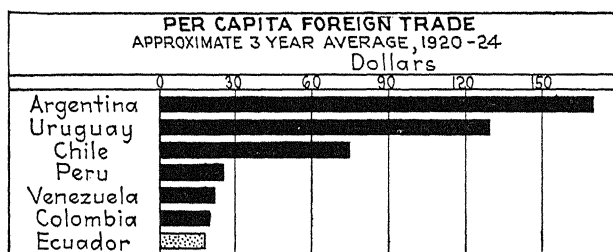


FIG. 39.—The low per capita foreign trade of Ecuador reflects the backward economic conditions in the country.

little to export, and hence is able to import but little. This is the case with Ecuador whose foreign trade is about \$12 per capita as compared with three times that average for South America as a whole and eight times that amount for a highly productive country such as Uruguay. In a mountain-ribbed country like Ecuador, a majority of whose population are people living on a low economic plane, it is quite out of the question to keep abreast of the progressive commercial nations. If Ecuador's participation in world trade is proportionately smaller now than it was 50 years ago, it means that the little country is progressing more slowly than the world as a whole. The proportion of Ecuador's trade that goes to the United States has materially increased during the last decade and now amounts to about 50 per cent of the total. Guayaquil is the most important port and

handles over 90 per cent of the country's imports and 60 to 70 per cent of its exports.

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CHAPTER V

PERU

The Past.—Peru was the key to the colonial empire of Spain in South America. It was the first viceroyalty to be established in that continent, and the last to throw off the Spanish rule during the wars of independence. Still earlier, Peru was the heart of the Inca Empire whose capital was the city of Cuzco. Throughout the country are the ruins of the marvelous stone structures,



FIG. 40.—Ruins of an Inca structure at Ollantai tambo, Peru. The massive stones were quarried, shaped, and fitted by a people who knew nothing of iron or steel.

paved roads, terraced mountain sides, and irrigation works, built by the Indians who once possessed these lands (Fig. 40). In 1531–1532, the Spanish conqueror, Francisco Pizarro, overthrew the Incas, and he and his successors reduced the native peoples to the pitiable condition in which their descendants now are. Peru became the most thoroughly Castilian of the colonies. The desirable lands passed into the possession of influential families and are still held largely by the descendants of those

families; and Spanish ideas regarding caste, manual labor, the church, education, and business became stamped upon Peru.

In 1821, the country declared its independence from Spain, and a few years later, began a stormy career of self-government. Like many of her sister republics, Peru has passed through a long series of political disorders, revolutions, and attempted revolu-

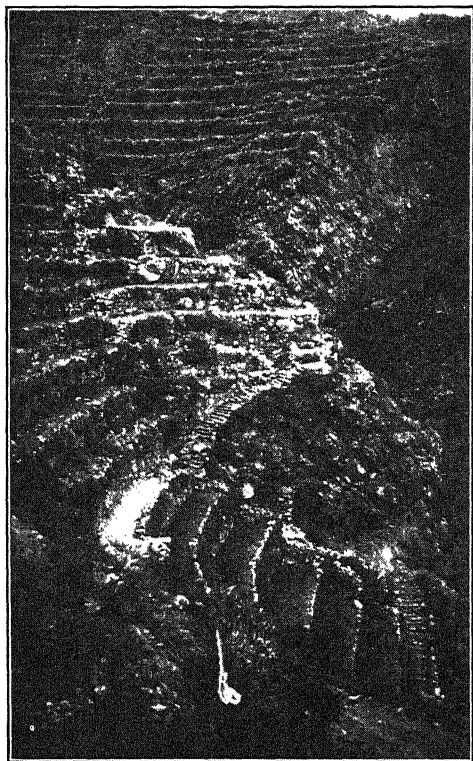


FIG. 41.—Example of terraced mountain sides in Peru (Pisac). They are faced with stone walls and formerly were irrigated and employed for crops. (Courtesy D. S. Bullock.)

tions. It also suffered a disastrous defeat at the hands of Chile in the War of the Pacific (1879–1883) and, along with her ally, Bolivia, lost the immensely valuable strip of coast land which contains the nitrate of soda deposits now in northern Chile.

Controlling Features of the Geographical Environment.—Peru has the three major physiographic provinces characteristic of the west-coast countries of South America within the tropics: (1) a

narrow coastal plain, with tributary mountain valleys; (2) a massive cordillera, 200 to 250 miles in width; and (3) an *Oriente*

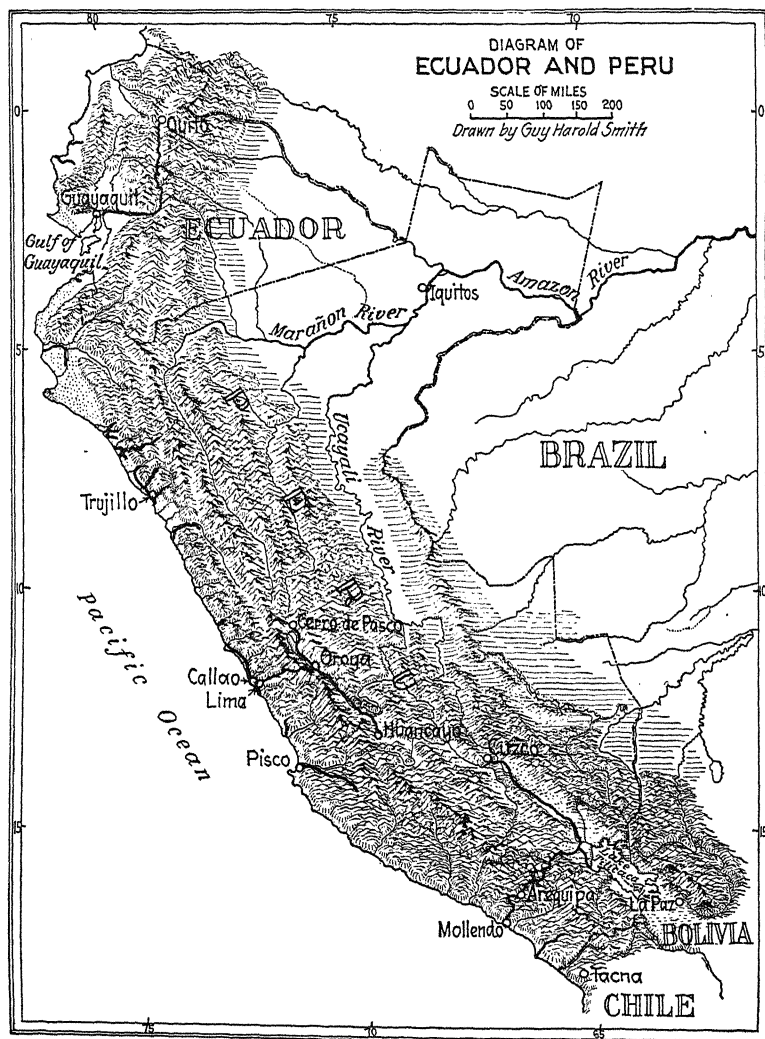


FIG. 42.—Relief map of Peru and Ecuador showing railways and principal cities.

or eastern region of dense tropical forest, which includes more than half of the land of the country. In Colombia and in most of Ecuador, the coast lands lie in the belt of tropical rains and are

heavily forested. But in Peru, conditions are quite the reverse, for the country lies in the belt of the southeast trade winds, which precipitate their moisture on the eastern slopes and on the high portions of the Andes. In so far as these winds pass the mountains and descend the western slopes to the coastal plain, they are dry winds.

Along the Peruvian coast, the winds are directed mainly by local conditions and usually blow from the south and southwest. Blowing thus from the cool Humboldt current to the warm land, they increase in temperature and are drying winds. The result is that the coast of Peru is a desert; no crops can be grown except by artificial irrigation, and the amount of water that can be diverted from the 50 or more short mountain streams is the determining factor in agriculture on this coast; and agriculture is the dominating industry of Peru.

The huge mountain wall of the Peruvian Andes has no low passes. The two railways that cross the main range do so at elevations of 14,688 feet and 15,665 feet, respectively. No attempt has yet been made to build a railroad across the eastern range in Peru. In the geography of this country, two factors are of primary importance; (1) the exceedingly mountainous surface and (2) the lack of sufficient rainfall on the Pacific slope. To these geographic handicaps, the life of the nation must be adjusted.

THE COASTAL REGION

Influence of the Humboldt Current.—Ocean currents are due mainly to prevailing winds which blow more or less constantly over parts of the sea. On the coast of Chile and southern Peru, these winds from the west and southwest impel the surface waters of the ocean partially against the edge of the continent and partially parallel with it from south to north. Thus, a strong north-flowing current of cold water, known as the Humboldt current, is propelled northward along the coast of Peru and makes the temperature of the air above it many degrees cooler than the usual temperature for those latitudes. It is said that the temperature of the ocean waters off the port of Callao (latitude 12°) is comparable to that off New York (41°) and Monterey, Calif. (36°).¹ In the more northerly parts of Peru,

¹ COKER, R. E. Ocean Temperatures off the Coast of Peru, *Geog. Rev.*, vol. 5, pp. 127-134, 1918.

the cooling influence of the current is increased by the upwelling of cold waters from the depths to replace the surface waters that the trade winds cause to drift westward across the Pacific as the Equatorial current. At least one investigator believes that this is the main cause of the low temperature along the Peruvian coast.¹ Since the ocean is cooler than the coast lands of Peru and since the winds blow from the sea across the littoral, they are warmed rather than cooled, as previously explained, and precipitate little moisture except the mists and fogs which are conspicuous in the winter. Thus, the lofty Andes cut off the coast of Peru from rainfall that might come from the east, and the Humboldt current prevents the local winds from the Pacific from delivering rainfall to the coast, and so this coast gets scarcely a shower from year end to year end.² Twenty or more miles inland, where the land is more elevated, rains fall. In the exceptional year of 1925, frequent and very heavy rains fell for 2 months, and enormous damage was done.

Another important influence of the cool ocean current is its effect upon marine life in the waters along the Peruvian coast. "No waters in the ocean teem with life as do those on the west coast of South America."³ The result of this upon the economic history of Peru has been far reaching. The superabundance of the lower forms of marine life provides food for a superabundance of fish with which these waters teem. The fish, in turn, provide food for the countless thousands of sea birds that haunt these waters and breed on the islands along the coast. The excrement of the birds and the fish waste which they leave form the valuable fertilizer known as guano, great quantities of which are found in this region. The Chincha Islands alone have yielded hundreds of millions of dollars' worth of this fertilizer.

The Guano Deposits and Their Economic Significance.—Along the coast of Peru are 38 small islands or groups of islands upon which the guano birds congregate in enormous numbers. A computation by a scientific investigator placed the number of birds on one island at nearly a million.⁴ The surface of the sea

¹ MURPHY, ROBERT C. *Geog. Rev.*, vol. 13, pp. 64-85, 1923.

² See BOWMAN, ISAIAH. The Andes of Southern Peru, chap. 9, discusses the climatology of the Peruvian Andes.

³ BUCHANAN, J. Y. *Proc. Royal Geog. Soc.*, vol. 8, p. 766, 1886.

⁴ COKER, ROBERT E. The Fisheries and Guano Industry of Peru, *Bull. U. S. Bur. of Fisheries*, vol. 28, pp. 335-365, 1908.

and the air are literally alive with them, and steamers almost plow their way through the endless flocks of birds flying close to the water. No less than 24 species of birds frequent the islands, and 12 or more nest upon them. However, a few, particularly the cormorants, pelicans, and gannets, deposit most of the guano. It has been estimated that at current prices, each pair of cormorants deposits guano to the value of \$1.50 a year. The great naturalist, Humboldt, directed attention to these deposits in 1804, but shipment of guano to Europe did not begin until 1840. In later years, the shipments reached hundreds of thousands of tons a year, and a steady stream of wealth flowed into Peru. Government revenues thus easily obtained were spent lavishly and wastefully. Contracts for railways, harbor improvements, and other public works involving great sums of money were let on the strength of the future revenue from guano.

It was not long, however, before the unpleasant truth dawned that the deposits were being rapidly exhausted. The disastrous war with Chile came in 1879-1883, and Peru emerged from it virtually bankrupt, with staggering debts, and her nitrate lands lost to Chile. In a settlement with foreign creditors, the guano deposits were turned over to the Peruvian Corporation (British) to the extent of 2 million tons. Removal by this corporation under laws that protect the birds had proceeded to the extent of $1\frac{1}{2}$ million tons, when a disagreement arose. The Peruvian government now seeks to stop further shipment of guano abroad because the fertilizer is needed by the planters of Peru for their own land.

As a point of geographical interest, it is worth noting that the Humboldt current is not only responsible for the abundant marine and bird life of this coast, and hence for the vast accumulations of guano, but it is also mainly responsible for the arid climate which has preserved the deposits from being removed by rain, for the most valuable constituents would be dissolved and carried away in a humid climate. The output of guano is now between 50,000 and 75,000 tons a year, most of which is used in Peru. The guano chapter in the history of Peru may be regarded as practically closed, but the financial burdens under which Peru will long struggle are a reminder of the orgy of spending which took place during that period of her history.

The Coastal Lands.—Everywhere along the west coast of South America, the mountains are close to the sea, sometimes

rising sharply from the water's edge and sometimes bordered by a belt of lowland. In Peru, the coastal strip has a width varying from almost nothing up to 100 miles, but the average width does not exceed 30 or 40 miles; and this is not all level land. Low mountains or foothills appear everywhere, but among these are level lowlands of considerable extent, and there are alluvial valleys reaching well back into the mountains. The coastal region has resulted from the comparatively recent uplift of a narrow border of continental shelf. The soil in the many valleys is alluvial. It is porous and, under irrigation and fertilization, produces splendid crops of cotton, sugar cane, and rice, although rice is not a major crop. On the western ranges of the Andes, in which the coastal rivers head, enough rain falls to give rise to some 55 short rivers that flow toward the Pacific and are partially or wholly diverted into irrigation canals. In the rainy season (December to April), these streams carry a large volume of water, but in the dry season, they shrink to mere rivulets, and about half of them do not reach the sea at all. These mountain streams are the life givers of the coast lands, for without them, the coast would be an absolute desert. Rain seldom falls on this coast. On rare occasions, heavy downpours have occurred as they did in 1925, but such occasions are very far apart, and the amount of water that falls in an average 5-year period is insignificant. One of the most lasting pictures that the traveler carries away from Peru is the utter bareness of the hills and mountains that skirt the coast and reach far inland. Most of the year, not a green thing can be seen except along the streams where irrigation is practiced; the Sahara is not more bare. Yet there is an imposing grandeur to the scene, a grandeur not soon forgotten.

Small as is the productive area of this coastal zone, it is agriculturally and culturally the most important part of Peru. It contains the great sugar and cotton estates which supply most of the agricultural exports of the country. It includes, of course, all of the seaports, and there are not less than 20 of these which carry on overseas commerce. It includes Lima, the capital and educational, social, and financial center of the republic. It is in the coastal zone that the wealthy and influential families have their homes. Moreover, this coastal strip contains the most important oil field in western South America. The rest of Peru supplies little to the outside world except minerals and

wool. Nearly half the value of Peru's exports consists of cotton and sugar produced on less than 1 per cent of the land of the coastal strip.

AGRICULTURE

Extent and Importance of Irrigation.—The rainfall is from 30 to 40 inches a year in the high Andes, and during January, February, and March, the mountain streams are at flood. They plunge downward several thousand feet in flowing a distance of 150 miles or less and become heavily laden with silt and gravel eroded from the upper valleys. As they flow out upon the coastal plain, their velocity is checked, and they deposit their load in the form of alluvial fans and flood plains of considerable

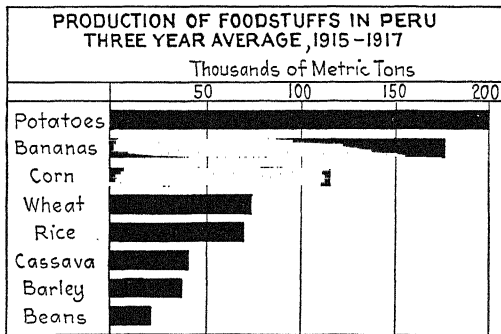


FIG. 43.

size. These flood plains and fans are the only agricultural lands of the coast of Peru. The Incas, and probably the pre-Incas, built irrigation works for controlling the flood waters and utilized them for the growing of crops. The Spaniards took possession of these canals and lands and assigned them to friends of the king or viceroy. Many of the irrigation works built by the Indians are still in use. A competent authority¹ believes that more land was irrigated by the Incas than is now under irrigation in Peru. In all, about 1,000 square miles, 640,000 acres are wholly or partially under irrigation along these streams, and it is believed that nearly as much more land is capable of irrigation by the expenditure of large sums of money for new and improved works. There are now scarcely any

¹ Charles W. Sutton, irrigation expert for the Peruvian Government.

storage reservoirs of large size, and nearly all of the irrigation improvements are privately owned. The Peruvian government, however, is interested in the extension of irrigation. An American irrigation engineer is regularly employed by the government, and several new government projects are under way. The small area of 1,000 square miles of irrigated land in this country of 500,000 to 600,000 square miles is the salvation of the nation, so far as agricultural exports are concerned. One of the large sugar estates, with its sugar central and other structures and its live stock is worth from 5 million to 8 million dollars. One large group of estates having its own railroad and port is valued at 30 million dollars.

Fifty-four per cent of the agricultural capital of Peru is invested in irrigated farms, and 59 per cent of the agricultural income is derived from them. It is estimated that one-half of the total national income from all sources is derived from activities dependent upon irrigation. Aside from the increase of national wealth from mining operations, about the only important means of augmenting the country's income is through an increased use of irrigation and improved methods of cultivation. But the planters are making money by present methods, and so it is difficult to persuade some of them that there is any serious need for change. A profit of a quarter-million to a half-million dollars from a sugar hacienda in a good year is not unusual.

The Sugar Estates.—Sugar is the most important crop of Peru. More money is invested in the sugar industry than in any other (about 150 million dollars), and yet the area of land devoted to sugar cane is only 120,000 acres, about one-third the area of a fair-sized county in the United States. The yield of cane per acre on the best estates is large (40 to 60 tons), and the cane has a large sugar content (10 to 12 per cent) resulting in a high yield of sugar per acre. The average cost of production on the better haciendas is about 2 cents a pound. If the raw sugar sells for the moderate price of 3 cents a pound, the owner of the hacienda receives an income of \$100 per acre or about \$400,000 on an estate containing 4,000 acres of sugar cane. Most of the sugar haciendas are in the northern valleys of the coastal plain (Fig. 44). Here in seven or eight valleys are about 30 large sugar estates. There are also many smaller ones, making a total of more than 100. The production is from 400 million to 600 million pounds a year, most of which is exported. All of

the more important irrigated valleys are connected by short lines of railway to ports from which the sugar is shipped. The largest of these valleys is Chicama, at whose seaward end is the chief city of northern Peru, Trujillo, and its shipping port, Salaverry. In the Chicama Valley are six large estates, one of which contains 17,000 acres, though not all of this is planted to cane. The Rimac Valley, in which Lima is situated, contains

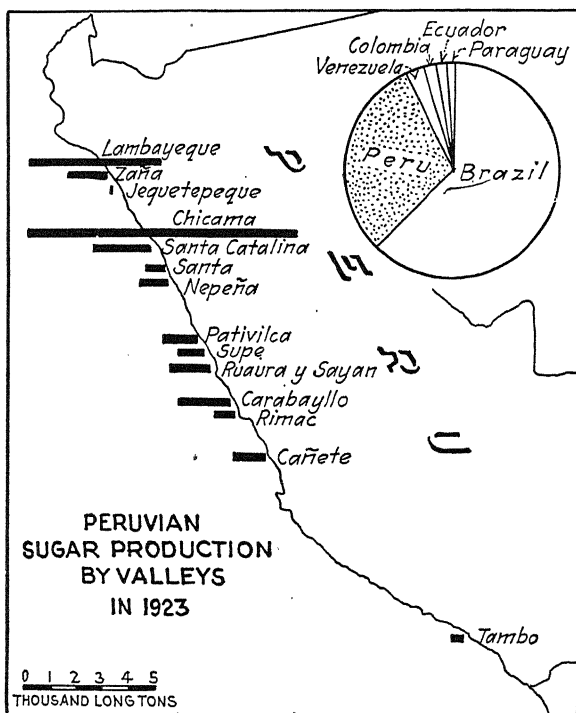


FIG. 44.—Most of the sugar of Peru is produced in irrigated valleys north of Lima. The circular graph indicates the relative production of sugar in six South American countries.

two large sugar estates, and a small quantity of cane is grown still farther south, but most of it is grown north of Lima.

Sugar Cultivation and Manufacture.—To produce well, sugar cane requires rich land, and the Peruvian planters use guano and Chilean nitrate generously. In planting a new field of cane, the land is plowed and harrowed, and a series of shallow parallel trenches a few feet apart is made. In these, pieces of sugar cane, containing at least one joint, are laid and covered with soil. Soon, the new plants spring up,

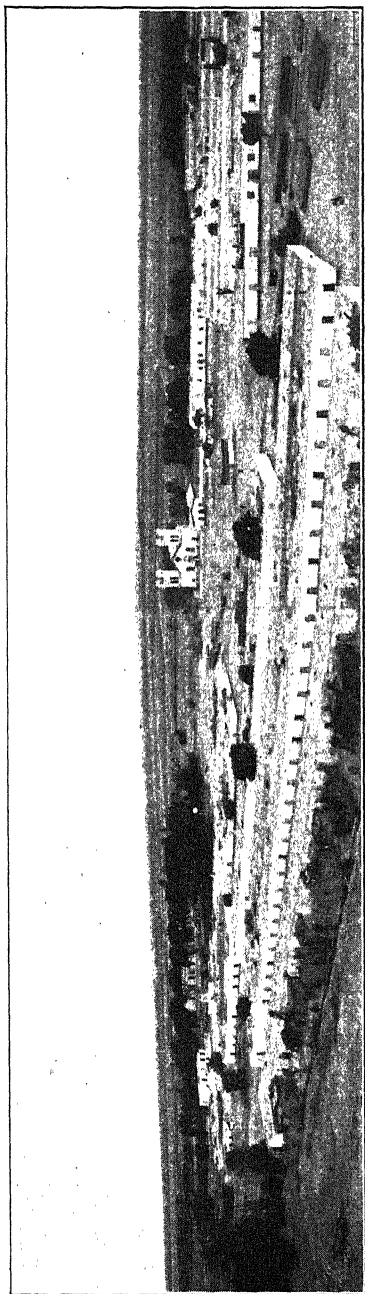


FIG. 45.—Buildings of the Cartavio Sugar Estate, Peru. The long row of low buildings in the foreground contains the homes of the workmen. (*Courtesy of F. A. Smith.*)

growing from the joints. While the growing cane is still small, the ground is cultivated to keep down the weeds, and irrigation water is supplied from canals or wells, for many wells are used to supplement the river water. Within 18 or 20 months from the time of planting, the cane is ready for cutting, and, thereafter, may be cut every 12 to 18 months for several years, usually 6 to 10 years. Cutting may take place at any time in the year and is not controlled by the seasons as it is in Louisiana or even in Cuba. The large mills grind cane practically throughout the year.

On the large estates are workmen's villages of small huts in which the Indian laborers live. The greater part of the labor is done by Indians who live in the mountains and come to the sugar estates to work when they are not needed on their little farms. Schools are provided by the owner of the estates and the children of the workers may learn to read, write, and compute. Common laborers earn 50 cents to a dollar a day, and there is usually a shortage of labor. Heavy drinking of intoxicants is common and coca chewing is almost universal among the Indians.¹ On the whole, the social and living conditions are far from satisfactory, but those employers who seek to improve conditions get scant cooperation from the ignorant laborers who are accustomed to this plane of living. Labor agitators, however, are common and labor troubles are frequent.

The Chiclin sugar estate is one that is doing the most for its workmen and their families. On the estate are six school buildings in which 400 or 500 children of the workers are given excellent educational opportunities. There is a night school for workmen themselves, and a domestic training school for girls. A park, playground, theatre, and church are maintained. There are electric lights, running water, and modern sanitary improvements. About 2,500 people live on the estate of 5,000 acres, mainly devoted to sugar cane, and about 3,000 cattle are kept for draft animals and for beef. Only a small part of the water needed for irrigation comes from the river; the larger part is obtained from six very large wells which are constantly pumped by means of engines. Notwithstanding the expenditures for social betterment made by the owners, this estate is a highly profitable one.

The Casa Grande group of estates is noteworthy for the magnitude of the properties and their operations, for nearly one-fourth of the sugar produced in Peru comes from them. There are 10 estates in the group, and three other groups in Chicama Valley have 18 estates, or a total of 28, comprising over 1½ million acres. In addition, the company owns 425,000 acres in the foothills of the Andes. Thousands of cattle, sheep, and hogs are kept, mainly to provide for the needs of the people who live in this little principality of sugar. Rice, cereals,

¹Leaves of the coca plant contain the important nerve stimulant found in cocaine.

fruit, dairy products, and other foodstuffs are produced. The company has a modern sugar mill capable of grinding 4,500 tons of cane daily. It owns and operates 125 miles of railway, in addition to a much larger mileage of portable field railways, and it owns its own docks at the port. The total property is said to be worth upwards of 30 million dollars. It belongs to a company that was originally German, but is now regarded as Peruvian. Many a feudal holding in Europe was far smaller and less wealthy than this.

The Cultivation of Cotton.—The second crop of Peru in value is cotton, of which a number of varieties are grown. Practically

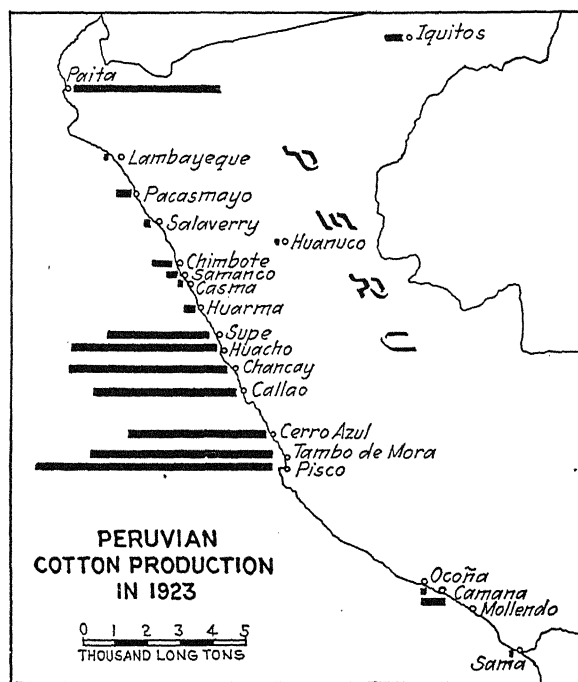


FIG. 46.—The cotton is grown in irrigated valleys and shipped from ports at the mouths of the valleys.

all of the cotton is produced on about 140,000 acres in 30 irrigated valleys near the coast (Fig. 46). The most important of these cotton-growing districts are in the neighborhood of Chincha and Pisco, south of Lima (Fig. 46). The Rimac Valley, in which Lima is located, is one of the most important cotton-growing districts. Another leading district is the region near Piura in the extreme north. A little cotton is also raised in the Montaña, in

the region of Iquitos on the headwaters of the Amazon. The variety most largely grown is known as *Tangüis*. It is a disease-resistant variety developed by Señor Tangüis, a scientific cotton planter of Pisco. This is proving to be the salvation of cotton growing in Peru, for the industry was threatened with ruin by a disease known as the *wilt*. The dreaded boll weevil has not invaded Peru. Not only is the *Tangüis* resistant to wilt, but it has a long staple ($1\frac{1}{4}$ inches) and yields 25 to 30 per cent more cotton to



FIG. 47.—Distribution of cotton growing in South America. Each dot represents 1,000 bales of 500 pounds each. (*Bull. Pan-Am. Union.*)

the acre than any other variety. In recent years, it has supplied about two-thirds of the Peruvian crop.

A variety known as the *full rough* has been grown in the north of Peru since the days of the Incas. Its peculiarity is the crinkly nature of the fiber which leads to its being mixed with wool in making certain types of textiles. Most of the Peruvian cottons have a long fiber, which adds to their value. Under the ideal climate and water control, the cotton fields of Peru produce on an average twice as much cotton per acre as those of the United States. The

crop is not planted every year, as it is in the United States, but the plant bears for several years, and some species grow to a height of 10 to 15 feet. Picking goes on every month of the year in one field or another. The best success is achieved on large plantations whose owners have the necessary capital to finance their operations, to employ up-to-date methods, and to own their own ginneries. There is a tendency for the small plantations to be absorbed into the larger ones.

When prices are high, cotton growing is very profitable, occasionally yielding 100 per cent profit. About nine-tenths of

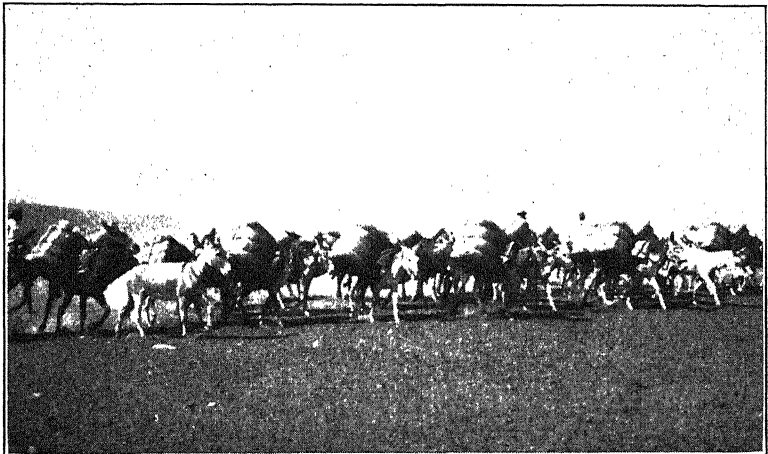


FIG. 48.—Burros carrying cotton bales to a sea port in Peru. (Courtesy Wonalancet Co. of Peru.)

the crop is exported; 1,500 bales a year are used in the eleven textile mills of the country, eight of which are in or near Lima. The average value of the cotton crop approximates 25 million dollars a year.

National Significance of the Sugar and Cotton Crops.—Both sugar growing and cotton growing are excellent adjustments to the peculiar geographical conditions of the Peruvian coast. Both crops readily adapt themselves to perennial growth; both are staple products in steady demand in a world-wide market; both are well suited to transportation long distances and are not perishable. They can be stored without deterioration and yield a good return to the planter.

The annual crop of sugar and cotton is steadily increasing, and in 1925, it was more than double what it was prior to 1915. As an illustration of the importance of the intensive agriculture that is carried on in the irrigated valleys of the Peruvian coast, it may be pointed out (1) that the value of the sugar exported each year from less than 200 square miles of this land nearly equals the value of all the agricultural products exported from the country of Venezuela, and (2) that the cotton annually exported from 220 square miles of Peru equals in value all the exports from Ecuador. The cotton and sugar of Peru are produced almost within sight of the sea ports from which they are shipped, while the coffee of Colombia and Venezuela is grown back in the mountains, necessitating an expensive journey to the port of shipment.

The Cultivation of Rice.—Rice is the most important food of tropical peoples. In the coast provinces of Peru and in many other parts of South America, rice and beans form the staple and preferred food of the working class. Of all the cereal starch foods, rice is the most convenient to use. It is as easily threshed and cleaned as other cereals and does not require the grinding and bread-making processes that wheat, barley, or rye requires. A handful of rice thrown into a basin of water and boiled a half-hour over a little fire is ready to eat. It is nourishing and satisfying, and, combined with the nitrogeneous food supplied by beans, makes a substantial meal.

The production of rice in Peru is practically confined to a narrow strip of coast in the extreme northwestern part of the country, where it is raised under irrigation and yields two crops a year. Much of the rice is of inferior quality and may be bought at a low price, which is welcomed by the poorly-paid peons. Some rice of superior quality is raised and is largely exported, while less expensive Asiatic rice is imported. The chief movement of this product is in the form of imports. The production of rice in Peru is increasing, having risen from 65 million pounds in 1910, to two and one half times that quantity 15 years later.

PETROLEUM

Peru was long the chief producer of petroleum in South America but has been surpassed by Venezuela. Fortunately, the oil fields are close to the sea; in fact, most of the wells are on the very shore, thus greatly cheapening the cost of marketing the oil. There are four recognized oil fields, all in the extreme northwest-

ern part of the country, not far from the boundary of Ecuador. Drilling operations in this region date from 1870, but production did not reach a million barrels until 1908; it rose steadily to about 8 million barrels in 1924 (Fig. 49).¹ None of the four fields has ever been a spectacular producer, and the average daily production is 10 to 15 barrels per well, but individual wells have yielded upwards of 1,000 barrels a day in the first days of their

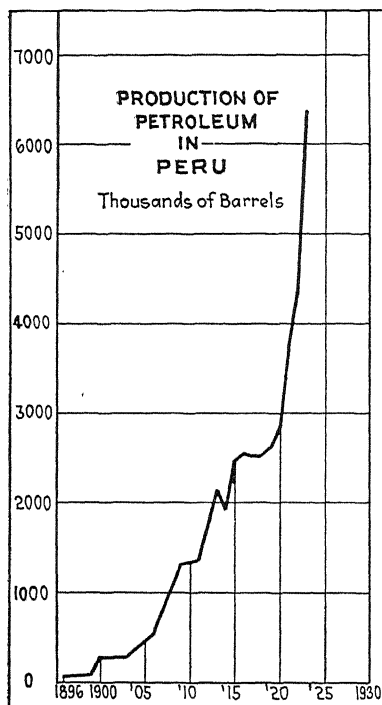


Fig. 49.—Peru ranks second among South American countries in petroleum production. In 1926 the output reached about 11 million barrels.

production. The oil is of excellent quality, containing a high portion of kerosene and gasoline. A large refinery is located at the port of Talara. The leading company in the field is a subsidiary of the Standard Oil Company.

THE CORDILLERA

The Ranges and the Intermontane Valleys.—The Andes of Peru form a lofty mountain belt from 200 to 250 miles in width

¹ The world's production in 1925 was about 1 billion barrels.

and occupy nearly 40 per cent of the area of the country. Between the narrow coastal plain and the towering western range is a belt of low mountains averaging 50 miles in width and constituting the western foothills of the mighty cordillera. The western range contains peaks 18,000 to 20,000 feet high and forms the water parting between the small rivers of the Pacific slope and the headwaters of the Amazon. The latter reach within about a hundred miles of the Pacific and have cut their zigzag way eastward across almost the entire width of the cordillera. The western range is practically continuous from end to end of Peru, and the two railways that have surmounted it do so at

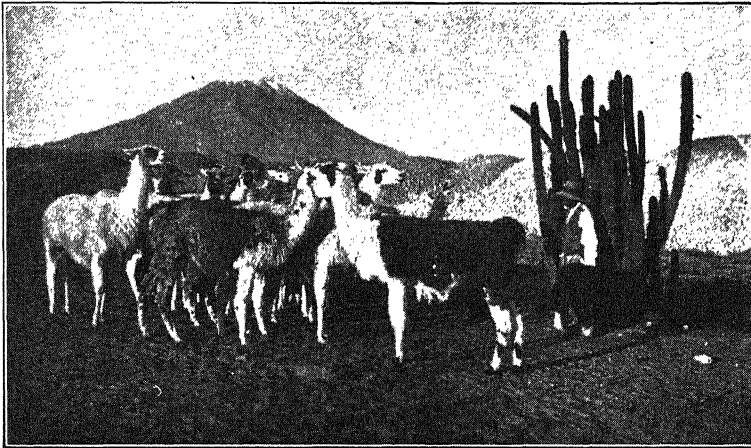


FIG. 50.—Flock of llamas near Arequipa, Peru. Mt. Misti in the background.

elevations of 14,688 feet and 15,665 feet, respectively. Nowhere else do standard-gage railways reach such altitudes.

Between the western range and the Oriente are other ranges, roughly parallel, less towering, and cut through by river valleys, thus making travel through them less difficult (Fig. 42). Between the ranges are high intermontane valleys such as the beautiful valley traversed by the Southern Railway between Lake Titicaca and Cuzco, or the broad valley that includes Cerro de Pasco, Oroya, Huancayo, and the connecting railway. In these mountains, the rainfall is sufficient for crops, and many of the valleys have a rather dense population of Indians. The Sunday market held at Huancayo is famous throughout Peru and is attended by hundreds or even thousands of Indians.

The valley floors and gentler slopes are everywhere cultivated by the Indians, and their mud huts and small villages dot the treeless landscape. Until the eastern range is reached, there are practically no forests. Cattle, sheep, alpacas, and llamas are raised, but the only well-developed grazing industry is in the province of Puno, which is adjacent to Bolivia.

The Inca ruins which are found in the cordillera amaze the visitor (Fig. 40). The mountains are rich in mineral veins and thousands of mines were worked by the forced labor of the Indians in the days of Spanish control. Now, most of the mining is done by corporations in a few localities where especially valuable mineral deposits occur.

Crops of the Cordillera.—Owing to the different altitudes in Peru, crops of the middle latitudes as well as of the tropics are raised, but none of them in large quantities, for there is only a limited area of land suited to agriculture. Deserts, mountains, and jungles make up most of the country. Under irrigation, small parts of the coast desert are supplying practically all of the surplus agricultural products. In the mountain valleys and on the tablelands, the Indians raise nearly sufficient food for the needs of those who live in the mountains and a small surplus for the coast cities. If sugar be omitted, however, Peru imports much more food than it exports, a condition that ought not to exist.

In the long valleys between the main ranges, almost all of the land that is fairly level and receives enough rainfall for crops is cultivated, for the Indians are mostly farmers if left to their choice of an occupation. Wheat, corn, barley, rye, potatoes, beans, cassava, and many kinds of vegetables are regularly grown. So far as quantity is concerned, the leading food crops are bananas, corn, and potatoes. Wheat and wheat flour constitute one of the larger imports of the country. Peru produces very little coffee or cacao but considerable coca, the plant from which cocaine is made. This is a plantation crop grown mainly on the eastern slopes of the Andes. Coca is more fully discussed on page 127. A semi-official investigation of the agricultural resources and products of 12 important *zones* or regions of Peru was conducted in 1918. These 12 zones include the principal agricultural sections. The results showed that approximately 1 million acres were devoted to food crops (not counting sugar) in these zones. The percentage of land devoted to six of

the leading crops was: corn, 23 per cent; wheat, $21\frac{1}{2}$ per cent; barley, $12\frac{1}{2}$ per cent; rice, $10\frac{1}{2}$ per cent; potatoes, $10\frac{1}{4}$ per cent; beans, $8\frac{1}{2}$ per cent.

The investigation showed that from sea level to 6,000 feet elevation rice, bananas, and cassava were leading crops; from 6,000 to 11,000 feet, corn and wheat were the most important; and potatoes in the higher altitudes.

LIVE STOCK

Cattle.—In the mountainous parts of Peru, there are numerous cattle haciendas or ranches, covering tens of thousands of acres each. Most of them belong to men or families who live in Lima or in other cities. There is little or no tax on this land, and Indian or Cholo labor is cheap. Most of the cattle are of an inferior type, and little attention has been given to improving the stock. On the irrigated estates near the coast, cattle are kept both for beef and for use as draft animals. On some of the estates, blooded stock of high quality is raised. Most of the beef finds its market in Peru, while the hides are exported. It is estimated that there are $1\frac{1}{2}$ million beef cattle in the country, a small number for so large an area.

Sheep and Wool; an Example of Adjustment to Environment.—The raising of sheep for wool is the outstanding industry of the plateau of southern Peru, especially of the Department of Puno, already mentioned. In these lofty pastures, from 10,000 to 13,000 feet in altitude, sheep are raised with notable success. There are upwards of 6 million of them in this region and 11 million in the entire country. The government has established an experimental sheep farm in the great valley traversed by the Cuzco division of the Southern Railway and has placed it in charge of a sheep expert from Scotland, assisted by a group of Scotch shepherds. In 1924, there were 15,000 sheep on this farm, partly natives and partly crosses between native sheep and high-grade imported stock. The sheep of this region are being slowly improved through these efforts, and the fleeces of the improved breeds weigh two or three times as much as those of the native sheep. The high Peruvian pastures are free from burr-bearing plants, and the wool is, therefore, especially clean. The sheep are healthy in the dry, cool climate, and the government expert considers this region one of the best for the production of wool, and the industry capable of great expansion.



FIG. 51.—Halfbreed Hampshire Down sheep on Peruvian Government Experimental ranch. (*Photo by Courtesy Col. R. J. Stordy.*)

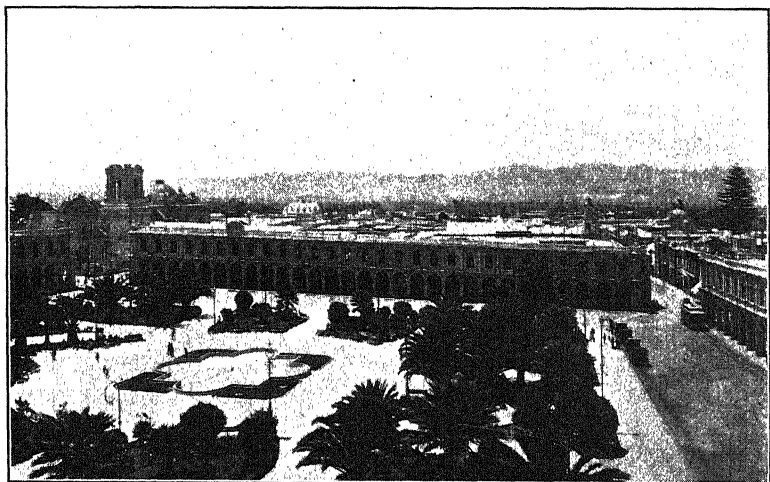


FIG. 52.—Main plaza of Arequipa, Peru. Similar plazas occupy the center of most cities in Spanish America.

Sheep have been raised in a desultory fashion in Peru since the early Spanish days. In a general way, the people of the Andes recognized that the region was suited to sheep raising, but they were isolated from the outer world, knew little of the progress in sheep breeding that was going on elsewhere, and remained content with inferior sheep. They found profit in the industry even under those conditions and were not concerned over improvements. But eventually, some one in Peru caught the spirit of scientific animal husbandry applied to sheep raising; the experimental farm was established, and Peru seems to be on the way to the important sheep industry to which its southern cordillera is exceptionally well adapted. Under the old regime, man was making a half-intelligent economic adjustment to the environment of the high pastures of Peru. Now he is learning that a much better adjustment can be made. But people of the tropical countries are slow to make changes. The whole economic history of any country is a series of new adjustments to environment to the end that the country shall support more people and do it better. The west coast of South America is making those new adjustments but is doing it with characteristic deliberateness.

The city of Arequipa, between Puno and the sea, is the great wool market of Peru, and the greater part of the country's clip passes through this city, where the wool is sorted, cleaned, graded, and baled.

The Llama, Alpaca, and Vicuña.—The llama, sometimes called the "camel of the Andes," is an American member of the camel family. The Indians had domesticated the llama long before the Spaniards arrived, and they still regard it as the most valuable of animals. Its gentleness, sure-footedness, ability to go long distances without water, and to live on surprisingly little food make the llama peculiarly suited to the lofty and rocky Andes where it lives. These animals will carry about 100 pounds, but if overloaded, they lie down and decline to move until their burden is lightened. They travel slowly, grazing as they go, and will not be hurried. The plateau Indian's wealth is often measured by the number of llamas he owns. The animals are locally valued at the equivalent of about \$5 each. Their long wool is used for spinning by the industrious Indian women who spin as they walk, tend the sheep, or sit in the market. It is estimated that there are 700,000 llamas in Peru, and twice

that number of alpacas, kept for their long heavy wool. The value of alpaca wool exported from Peru has usually exceeded the value of sheep's wool. The vicuña, a member of the same general family as the alpaca and llama, lives wild at very high altitudes and is hunted for its skin which bears a fine, silky wool, like beautiful fur. These animals were threatened with extermination by the hunters, and the government has enacted a law for their protection, but the law cannot be well enforced.

THE PERUVIAN INDIANS

The Indian as an Economic Factor.—The full-blood Indian clings to the mountains and plateaus. He prefers isolation or residence in his own village among his own people to residence among the whites or mestizos of whom he is suspicious. Of all occupations, he loves best to cultivate a piece of ground that has belonged to his ancestors and now belongs to him. He may accumulate a little wealth by rearing and caring for llamas, alpacas, or sheep. He is content with a mud hut, particularly if it is the one in which he was born. The white man's luxuries make little appeal to him, and money appeals only because it will purchase coca, liquor, and a few other items that he cannot produce on his little mountain farm. These are the "free Indians" some of whom are induced to work in the mines or on the sugar and cotton estates at times when they can leave their own crops. But when the time comes for harvesting these meager crops, the Indian is wont to leave the white man's employ and his money wages, and to return to the mountains. The accumulation of money has little attraction for him. He is happiest when left entirely alone, but under that condition, he is scarcely a factor in the economic life of the nation, for he produces only enough to maintain his poor existence.

In the interior, there are considerable numbers of "community Indians" who have always held their land in common, but who are otherwise like the other free Indians. Another large class owns no land but lives on the haciendas; these peons are bound to give their patrons a certain amount of labor each year and are more or less legally attached to the estates. They may live on the same estate, generation after generation, and often regard themselves as attached to it. Some seek to escape and may be forced unwillingly to remain until their "debt" is paid. Since the overseers keep the accounts, the debt may be

very slow in liquidation. The Indian is, by nature, docile, stupid, sullenly obedient, silent, slow, and quite lacking in loyalty to his employer or patron.

Inefficient and irresponsible as the Indian is, he nevertheless does most of the manual labor of Peru and the other Andine countries within the tropics. By such labor as the white man



FIG. 53.—Lampa Indians near Puno, Peru.

can obtain from the Indian, the larger industries of the country are carried on. These are chiefly mining, ranching, and plantation agriculture. Economic progress under such labor conditions is slow, the growth of the national wealth is slight, and the purchasing power of the nation is small. There is no comparison between the economic advance that can be made under the labor

system of Peru or Bolivia and that of the self-respecting, intelligent, free labor of Canada and the United States.

THE MINING INDUSTRIES

Mining Development.—A great deal of mineralization has taken place in the rocks of the Andes in past geologic ages. During the Spanish colonial period, Peru was a synonym for gold, and great quantities of gold and silver were mined by means of forced Indian labor which cost almost nothing. Transportation from the high Andes to the coast was expensive in time, but time was a small element of cost in the reckoning of those days. Hundreds of deposits of gold and silver were worked then which could not at present be mined at a profit. After the revolution which separated Peru from Spain, mining operations fell off, and one by one, most of the mines were abandoned. More recently, a few of the richest deposits have passed into the ownership of foreign corporations and are being mined on a large scale by modern methods and are proving profitable, in some cases very profitable. As already pointed out, the ranges of the Andes place great difficulties in the way of transportation. It is probable that many rich mineral bodies exist among these mountains, but most of them could not be worked at a profit if they were found, because of the cost of transportation to the nearest railway or to the coast, which might be 100 miles away. Very slowly, railways are reaching a few of the chief mineral regions. The importance of railways may be seen from the fact that, aside from the petroleum fields near the coast, about 90 per cent of the value of all mineral products now being mined in Peru comes from the region along the Central Railway and its extension to Cerro de Pasco.

Railroads are essential to the development of the mineral resources; and, conversely, the development of mines is essential to the success of the railroads. The two must grow together. Both call for foreign capital, and foreign capital calls for a safe and friendly attitude on the part of the government. Tens of millions of dollars must be risked in the larger enterprises, and years may elapse before there is any return. Having taken the risks and awaited the returns, the investor has a right to expect considerate treatment from the government. On the other hand, the foreign corporation has a duty to maintain a just attitude toward the country in which it is operating. It is only logical

that South American countries should look, at least in part, to North American capital for their development, and that North American capital and skill should increasingly go into South America. But this can be achieved only on a basis of fair treatment on both sides.

Gold and Silver.—Peru yields gold to the extent of about 3 million dollars a year, mainly obtained from the copper workings. Silver is produced also in connection with copper, and in a smaller way with lead, in values exceeding 10 million dollars a year. The Cerro de Pasco Copper Corporation is the largest single producer in Peru of both gold and silver. Another strong and experienced American corporation is developing proved deposits in northern Peru and is likely to increase notably the copper, silver and gold output of the country in the future. Peru ranks third or fourth among silver-producing countries, the others being the United States, Mexico, and Canada. The Cerro de Pasco mines were worked for their silver for more than 250 years, and produced over a half-billion-dollars' worth during that time.

Copper.—The mines of the Cerro de Pasco Corporation (underground workings) are east of the western Andes, at an altitude of about 15,000 feet. The company's 15-million-dollar smelter is located at Oroya, on the Central Railroad of Peru, and is connected by railway to several mines in the region. Over 30 million dollars have been invested, and 25,000 people are almost wholly dependent upon the operations of this company. The workmen are Indians, who can endure hard work in the extremely high altitudes; a staff of about 200 white men direct the operations and supply the technical ability. The annual output is above 100 million pounds of copper, with the large silver content already mentioned. The company mines its own coal, and from the best of it makes part of the coke which it requires. Additional coke is imported. There are a number of small copper mines operating, but the mines at and near Cerro de Pasco produce more than 90 per cent of the copper mined in Peru. The freight traffic developed by these mining operations constitutes the main support of the mountain portion of the Central Railroad, which passes through Lima and has its ocean terminal at Callao (Fig. 42).

Coal.—No country in South America produces much coal, but among those that produce any, Peru ranks second, following Chile. Coal of medium quality occurs in many places in Peru,

but it is mined only in connection with the working of the Cerro de Pasco mines, railways, and smelter. Some of the coal beds have a thickness of 6 to 12 feet, but usually they are thinner. The total output is from 250,000 to 300,000 tons a year. No coal is exported and only a little is imported. Houses are not heated in Peru, and coal is seldom used for cooking.

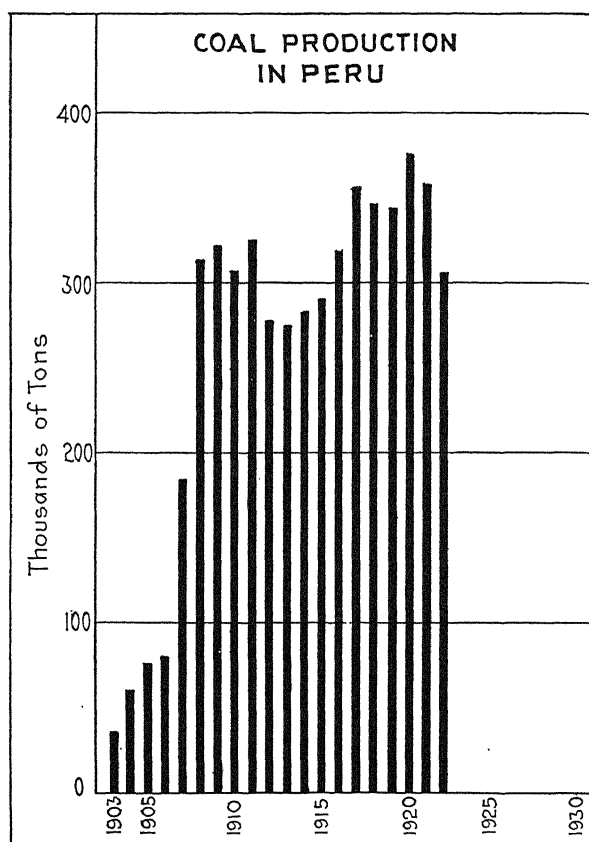


FIG. 54.—Nearly all of the coal mined in Peru is used in the operations of one copper company.

Other Mineral Products.—Small quantities of lead, bismuth, borax, and tungsten are produced, but they are of relatively little consequence. Nearly all of the world's supply of *vanadium*—not a large amount—comes from mines near Cerro de Pasco, owned by an American corporation. When alloyed with steel, vanadium makes the latter exceptionally strong and tough. This

alloy steel is used extensively in making parts of automobiles where great strength and lightness are demanded. The annual output of vanadium ore in Peru rarely exceeds 4,000 tons a year. The famous *quicksilver* mines of Huancavelica which were important in the Spanish days are still producing, but not continuously. The total annual value of the mineral products in Peru reaches 50 million dollars, the chief minerals being petroleum, copper, and silver. These three together equal or exceed in value the combined output of sugar and cotton. Among the South American countries, Peru ranks second, in the value of mineral products, following Chile and leading Bolivia.

EASTERN PERU

The Montaña or Oriente.—Since Peru has a boundary dispute with Ecuador, its area can be given only tentatively at 534,000

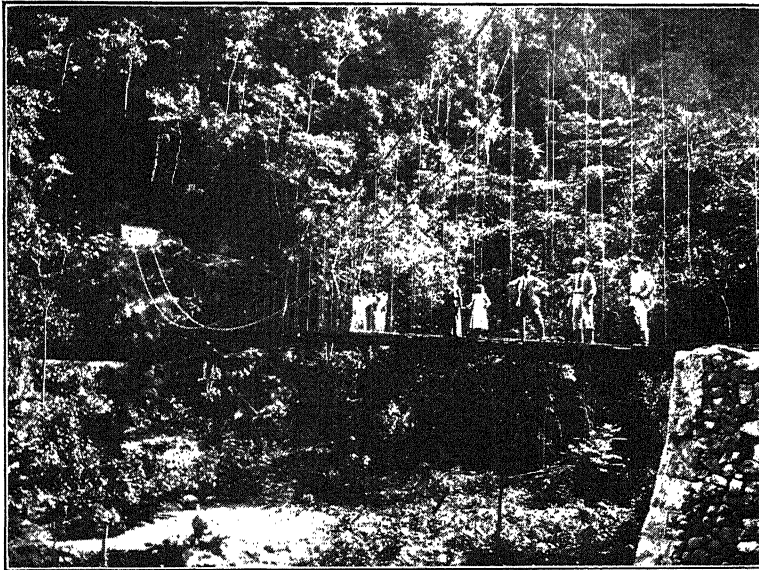


FIG. 55.—A suspension bridge (puente Río Colorado) in the Montaña of Peru. A bridge is a rare thing in this jungle.

square miles. More than half of this lies east of the cordillera. Here, the rainfall is heavy, reaching 100 inches a year and more, and falling most heavily from December to April. The so-called dry season is far from dry. Most of this region is lowland, a part of the great Amazon jungle already described, and known both as

the *Montaña* and as the *Oriente* (Fig. 42). The intense tropical heat of the lowlands, the excessive rainfall, the poor drainage in the wet season, and the resultant dense tangle of trees, vines, and undergrowth make the plains a region to which white settlers are little attracted (Fig. 55). At some future date, the pressure of population in the attractive parts of the world may bring about the settlement of the higher and cooler lands of the *Montaña*.

There are lands of a few thousand feet altitude on the eastern slopes of the Andes and in the mountain valleys which are exceedingly fertile, reasonably healthy, and capable of agricultural development, and they are occupied here and there by farms and haciendas. At some one of the various altitudes, almost any crop of the tropics and subtropics can be grown in soil enriched by ages of plant decay. If agricultural settlers should attempt the conquest of these lands, as they are already doing in a small way, crops of coffee, cacao, cotton, tobacco, corn, and fruit can be produced. But when they are produced, what shall be done with them? Any surplus beyond the needs of the nearby population must seek markets considerably removed or far removed; and the cost of sending these products by rail over the many ranges of the Andes to the Pacific coast, or by the rivers to the Atlantic coast 2,500 miles away, will be very high,—so high that the farmer of the *Montaña* will get little for his labor, if in fact the products will even pay the cost of transportation. It is one thing to raise crops in such a remote region and another to market them at a profit. Whatever may in truth be said of the fertility and low price of land in the *Montaña* of Peru, the fact remains that its geographical location in one of the most inaccessible parts of the continent will cause a long delay in its development.

Rubber.—Eastern Peru is part of the basin of the Amazon, which for many years was the chief source of the world's rubber. The city of Iquitos, on the upper Amazon was the chief rubber-collecting port for Peru, whose production amounted to millions of dollars a year in the decade from 1900 to 1910. Rubber gathering was then one of the leading industries of Peru, but it declined to a fraction of its former volume because of the cheapness with which plantation rubber is produced in the Far East. In 1923–1924, the United States government sent a commission of specialists into the Amazon valley to study plantation rubber possibilities, with a view to the liberation of American rubber users from the control of the rubber supply by far-eastern producers

It is doubtful whether the Amazon Valley with its limited supply of competent labor can develop a plantation rubber industry in competition with the Far East. With the decline in the price of rubber, some of the rubber-gathering companies turned their attention to the collecting of balata which is fairly abundant in the Amazon forests and which is in demand in European and North American markets. In 1925, raw rubber increased rapidly in price and reached a figure which again stimulated production in the Amazon basin.

Coca.—On the eastern slopes of the Andes, the coca shrub is grown. This plant has no connection with either the cacao or the coconut tree. The coca shrub grows wild in the forests of the Montaña, but most of the coca leaves come from plantations. From the leaves of this shrub, the important drug, cocaine, is made. The Indians of the cordillera chew the leaves almost constantly and derive from them powers of endurance and resistance to hunger that are remarkable, but the general effect upon the user is stupefying. Nearly all of the Andine Indians from Colombia to northern Chile are addicts to this habit and will make almost any sacrifice to secure the leaves. It is believed that the mental dullness of the Indians is partly due to the use of coca, generation after generation. Coca is one of the chief products of the middle slopes of the Montaña of Peru and Bolivia, and the *cocales* are the most profitable industries of the region.

INDUSTRIAL AND COMMERCIAL ACTIVITIES OF PERU AS A WHOLE TRANSPORTATION

Waterways of the Oriente.—Several large tributaries of the Amazon flow through eastern Peru and provide water routes that are used by canoes, launches and steamboats. Ocean-going steamers reach Iquitos in northern Peru, 2,300 miles from the Atlantic. When rubber was a large export from the Oriente, these rivers were in constant and active use and formed almost the only routes of travel in this densely forested region. Since the decline of the rubber-gathering industry, the rivers are much less used. An illustration of the extent to which shippers will go in order to escape the difficulty of transporting goods overland from the eastern and western parts of Peru is seen in the journey in 1922 of a Peruvian ship from Callao through the Panama Canal, around the northern part of South America, and up the

Amazon to Iquitos, a trip of 6,500 miles. Yet Callao and Iquitos are only 700 miles apart in a direct line.

Trails.—Throughout Peru, the principal means of transportation is the pack train composed of mules or llamas. The former carry 200 to 300 pounds and the latter 75 to 100 pounds. Railways are so far apart that a large proportion of the products that are shipped by railroad are carried scores of miles by mules or llamas to or from the railway. Coffee, cacao, and coca raised in the edge of the Montaña can reach a market only by long journeys on mule back. Wool and hides may be carried thus 100 miles to reach a railway or market. Even ores are carried scores of miles from mines by mules or llamas. Under such conditions of transportation, no country can make rapid economic progress. Yet, in such a mountainous country, the cost of motor roads and railroads is nearly prohibitive, and when a railroad is built, it is sometimes possible for a pack train to carry products at as low a cost as the railway and in direct competition with it.

Roads for Vehicles.—Peru is undertaking the construction of modern roads in a few places. Several miles of concrete road have been built to two suburbs of Lima. Well-graded roads exist here and there where for special reasons a motor or cart road is essential. For example, the central route from Lima to Iquitos includes 76 miles (between Oroya and La Merced) of automobile road, partly maintained by tolls. A modern road 105 miles long in the Department of Puno connects the Santo Domingo gold mines with the Southern Railway. Along the coastal lowlands, there are sections of slightly improved road used by motor vehicles. A comprehensive report made by an American official¹ in Peru lists upwards of 100 roads or parts of roads that can be traversed by motor vehicles, although the majority of these are mere tracks worn by carts or pack animals.

An example of a main freight route across Peru exists in the Northern Trail made up of the following links:

Port of Pacasmayo to Chilete, 65 miles, railway

Chilete to Balsapuerto, 433 miles, relays of mules over trails

Balsapuerto to Yurimaguas, 105 miles, canoes

Yurimaguas to Iquitos, 452 miles, launches.

This route is 1,400 miles long and requires about 30 days of hard travel. Peru has more miles of railway than it has of good roads.

¹ DUNN, W. E. *Trade Information Bull.* 198, U. S. Dept. of Com., 1924

In fact, there are only a few hundred miles of the latter, and not over 20 miles of these, except those within a few of the chief cities, have hard surface.

Small Railway Mileage.—Peru has some 30 different railway lines, with a total length of less than 2,000 miles; three-fourths of the mileage is controlled by the Peruvian Corporation (British). Of these 30 separate lines, four exceed 100 miles in length; the Central (250 miles), the Southern (550 miles), the Northwestern (130 miles), and the Cerro de Pasco (135 miles). Most of the others are short lines extending from a port to irrigated plantations of sugar and cotton (Fig. 42). There is no railway system in Peru, but rather a number of detached lines of different gages. A few of the short lines and the Central Railroad earn a small profit; but as a whole, the railways of Peru are unprofitable, and the bonds and stocks of the Peruvian Corporation are quoted much below par.

The Cerro de Pasco Railway belongs to the Cerro de Pasco Copper Corporation, and is used mainly, though not wholly, for the operations of that company. The Peruvian government has constructed and operates three short lines. Four lines are being extended by the government, but progress is very slow because of high costs and lack of funds.

The Central Railway of Peru is one of the most daring feats of railway construction in the world. Without employing cog rail, the line ascends the Andes to a height of 15,665 feet, following the valley and cañon of the Rimac River. It runs from the port of Callao through Lima to the summit tunnel near the crest of the mountains; thence to the smelting city of Oroya, thence by a more recently built extension southward to Huancayo. There are 65 tunnels, 67 bridges, and 16 switchbacks on the line. For miles, the track is built on a narrow shelf of rock cut into the precipitous wall of the cañon. It does not seem possible that any engineer would have undertaken to construct a railway to such an altitude and by such a route, but it was done. Passenger trains go "up the hill" one day and back the next, and accidents are practically unknown. By reason of the traffic supplied by operations of the mines, this railway is paying a profit upon its present capitalization, but not on its original cost. The road was laid out and largely built by the intrepid American engineer, Henry Meiggs, who died before the work was completed. It was undertaken during the years when Peru was deriving very

large revenues from guano and was expending money lavishly. It is estimated that the 136 miles of road from Callao to Oroya cost an average of \$200,000 a mile and a total of not less than 7,500 lives. It was the expenditures on railways that hastened the financial collapse of the Peruvian government and led to the subsequent transfer of its railways to the Peruvian Corporation by which they are now controlled.

The Southern Railway of Peru was also the product of the genius of Henry Meiggs, but it was completed by another American engineer, Henry Thorndyke. Its ocean terminal is at Mollendo. The road winds and loops among the mountains, climbing gradually to 7,550 feet at the city of Arequipa; thence on to an altitude of 12,535 feet at Lake Titicaca. The lake is navigated by modern steamships belonging to the railway company; from the Bolivian end of the lake, the railway continues to La Paz. A northern extension of the railroad from the junction at Juliaca crosses the divide at an elevation of 14,688 feet and reaches Cuzco, the old capital of the Inca Empire. The Southern Railway, like the Central, is standard gage ($56\frac{1}{2}$ inches), and its entire length is about 550 miles. It is planned to connect the two main railways of the country by a line that is now slowly extending through the valley between the Andine ranges. The Southern Railway has no great mining centers along its route as the Central has. Its largest item of freight is wool, and that is far from sufficient to afford a profitable business. The Bolivian portion of the line can scarcely meet the competition of the shorter route to the coast at Arica. The poor financial return of this railroad illustrates a fact of wide application in the mountainous parts of South America, namely, that the majority of railways do not pay. Governments must bear a considerable part of the deficit until such time as the increasing development of the region shall supply the necessary traffic to meet the expenses of the railway, and this may be a long period. Unfortunately, the tropical Andine countries are poor in revenues, and their borrowings are always about up to the limit of their credit.

The Peruvian Corporation.—Owing to the large part that the Peruvian Corporation plays in the economic life of Peru, a brief account of the origin and activities of this company seems desirable.

In 1869, 1870, and 1872, the Peruvian government obtained large loans in London, and with the proceeds embarked upon a course of heavy

expenditures. A few years later, Peru entered a disastrous war with Chile and emerged in a condition of almost complete bankruptcy. The British bond holders formed a protective organization, and as the result of prolonged negotiations, it was finally agreed between the bond holders and the Peruvian government that the former should take over the entire Peruvian debt represented by the loans of 1869, 1870, and 1872. In return, the government of Peru granted to the bond holders for 66 years all of the state-owned railways, the free use of harbor works at the principal ports, and the right to the navigation of Lake Titicaca. The bond holders were to be allowed to remove 3 million tons of guano (afterwards reduced to 2 million tons) and to have the exclusive right to export Peruvian guano; they were also to be paid £80,000 annually for 30 years. In 1890, the Peruvian Corporation was formed to represent the bond holders, to operate the railways, and to carry out the terms of the agreement. The bond holders have lost very heavily, for the preference stock and ordinary stock which they received is worth but a fraction of its face value, and is paying little or nothing in dividends.

Manufacturing.—Nearly all of the manufacturing that is done in Peru consists of working certain of its agricultural or mineral products into marketable form. The largest manufacturing establishment is the great copper smelter at Oroya which smelts the ores of the three copper-silver mining regions controlled by the Cerro de Pasco Corporation. There are a few other small smelters in the country.

In the oil fields of the north are two oil refineries, one of which is large and modern. These refine the major part of the petroleum products used in Peru. Over 30 of the large sugar estates have their own sugar mills in which raw sugar is made. The combined product of these sugar mills is greater in value than the product of the Oroya copper smelter. Cotton ginneries, cotton-seed oil mills, and cotton-spinning and weaving mills form a group of manufacturing industries of some importance. The two largest cotton mills are located in or near Lima. The two mills employ a total of 1,000 persons and make the coarse goods purchased by the lower and middle class trade. There are also several small woolen mills which make coarse woolen goods for the home market.

A number of flour mills, tanneries, rice-polishing mills, small factories for making cocaine, tobacco products, alcoholic liquors, soap, shoes, clothing, and certain other products are in operation. In all, some 50,000 persons are employed in manufacturing, in

addition to the number employed in small shops where hand work is done.

Both coal and electric power are used in the Cerro de Pasco operations. Fuel oil is used to an increasing extent. The sugar mills use the refuse cane (bagasse) for fuel, and there are several good-sized hydroelectric plants in the country. Thus a beginning of manufacturing has been made, and, under a high protective tariff on imported manufactures, progress may be expected; but Peru has not yet reached the industrial stage of development.

Foreign Commerce.—In proportion to its area and resources, the foreign trade of Peru is small. This is due mainly to two

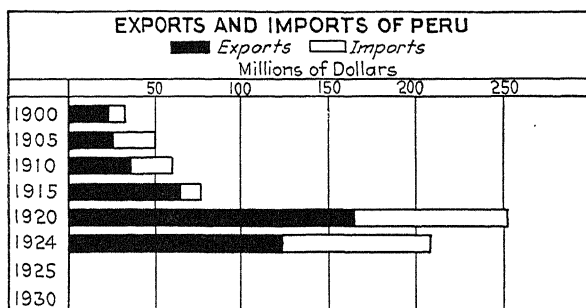


FIG. 56.—The exports of Peru regularly exceed the imports.

causes: (1) the high proportion of Indians and mestizos in the population, and (2) the difficulties of transportation within the country. The Indians buy few imported goods and produce little that enters foreign trade, except as they work on the sugar and cotton estates and in the mines. Their wages are low and their buying power small. Most of the mestizo population also has small purchasing power, though it is probably double that of the Indian, man for man. Indians and mestizos make up fully 90 per cent of the population of Peru.

Of the country's annual exports of approximately 100 million dollars, four items constitute 80 per cent of the total, and the four are of nearly equal annual values; (1) sugar, (2) petroleum products, (3) copper and its included silver, (4) cotton and its products. Great Britain and the United States take two-thirds of the exports of Peru. Chile, which takes much of the sugar and some of the oil, is the only other large buyer of Peruvian products.

The imports always total less than the exports in value, and often not over half so much. These are mainly manufactured goods which come most largely from the United States (40 per cent) and Great Britain (20 per cent). Since the opening of the

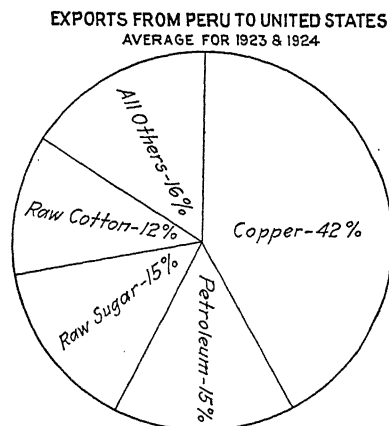


FIG. 57.

Panama Canal, the trade of the United States with the west coast of South America has increased notably.

Ports of Peru.—Callao, the port of Lima, is the most important in Peru and receives more of the imports of the country than all

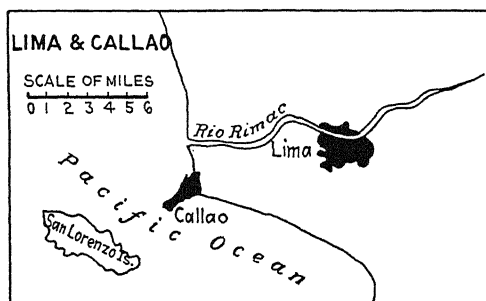


FIG. 58.—Lima and its port, Callao.

other ports combined. This is due both to the large value of imports destined for Lima, the largest and richest city of the country, and to those destined for places served by the important Central Railway, notably the Cerro de Pasco region.

On the side of exports, Callao has no such predominance over the other ports. It is equaled or exceeded by Talara, the chief oil-shipping port. Mollendo, the ocean terminal of the Southern Railway of Peru, has a smaller foreign trade than might be expected, considering that it is the ocean gate for all southern Peru and a part of Bolivia. It will be remembered that nearly every one of the important irrigated valleys has its own port. The foreign trade of Peru has reached a value six to eight times as great as it was in 1900, and three or four times as great as it was in any year before the opening of the Panama Canal.

THE TRADING COMPANIES

W. R. Grace & Co.—No account of the commerce of the west coast of South America can omit reference to the great and varied activities of W. R. Grace & Co., or "Casa Grace," as it is commonly known in scores of west-coast places. The founding of this company dates from 1851, when James Grace of Queens-town, Ireland, established an unsuccessful agricultural colony in Peru. His son, William R. Grace, afterward mayor of New York, became interested in selling ships' supplies in Peru, and from this small beginning has grown the enormous business now conducted by the House of Grace. It operates various lines of ships between United States, Caribbean, and South American ports. It has banking houses or agencies in 45 cities in Peru and Chile and many more in other Latin American centers. It owns one of the large sugar estates of Peru, a nitrate property in Chile, cotton mills, and other mills in Peru, and a chain of retail stores in Chile. In practically every port of any importance from Panama to Concepcion, the Grace interests have fleets of launches, lighters, and other harbor craft for the handling of ocean commerce. On the east coast, Grace is one of the largest coffee dealers in Santos and Rio de Janeiro. Through its steamship lines, banks, mercantile establishments, and ramifying trading interests, it is the outstanding commercial company of the west coast of South America.

Other Large Trading Companies.—In the west-coast ports, one sees again and again the names of these American and British trading companies: Gibbs & Co., Wessel Duval & Co., Williamson & Co., Duncan Fox & Co., Graham Rowe & Co., and less frequently, the German firms of Gildemeister & Co., and Huth & Co. All of these companies have been long engaged

in importing, exporting, and mercantile enterprises and are widely known. Each company is the exclusive local selling agent for a long list of European or United States manufacturers. A very important part of the mercantile business of the west coast is handled by these trading companies.

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CHAPTER VI

BOLIVIA

The Physical Features and Geographical Regions.—Because of an unsettled boundary line between Bolivia and Paraguay, only the approximate area of Bolivia can be given. The Bolivian official figures claim 514,464 square miles. The two neighboring countries, Peru and Bolivia, have about the same area, but each is larger than Colombia, Venezuela, or Chile, and is equal in area to Germany, France, and the British Isles combined.

Bolivia has two major geographical regions each of which has distinct subdivisions (Fig. 59). About two-fifths of the country is made up of the lofty ranges of the Andes and the plateaus that lie between them; and about three-fifths consists of tropical plains that may be reached from either ocean only with large expenditure of time. As the outcome of the war with Chile (1879–1883), Bolivia lost its short strip of coast land and no longer touches the sea. It lies athwart the Andes system in its widest part, and in one of its highly mineralized sections. Between the ranges of the cordillera lies the great tableland of Bolivia, an intermontane plateau, formerly a huge valley but now filled up to a level of over 12,000 feet with gravels and lavas which have accumulated throughout long geological ages. In the peculiar gorge at La Paz, these gravels are exposed for a depth of more than 1,500 feet. The peaks of the Bolivian Andes attain heights of 20,000 to 24,000 feet and are perpetually snow capped although they are within the tropics; the lowest passes are from 12,000 to 14,000 feet above sea level. Nowhere else does a nation with cities, railways, and modern industries exist at such an altitude. The plateau of Tibet is larger and is equally lofty, but it is the home of one of the most secluded and least known of peoples, scarcely touched by European civilization.

East of the Andes lie the great tropical plains which make up 60 per cent of the total area of the country (Fig. 3). In part, these are densely forested, but toward the southeast, the forests give place to the scrub and grass lands of the Bolivian Chaco.

Through these eastern plains flow large and partially navigable rivers that reach the Amazon and the Paraguay. A large part of the contact of eastern Bolivia with the outer world is by way of these rivers which flow to the distant Atlantic. If the people of Bolivia succeed in maintaining a progressive nation in a country like this, they deserve the respect of the world.

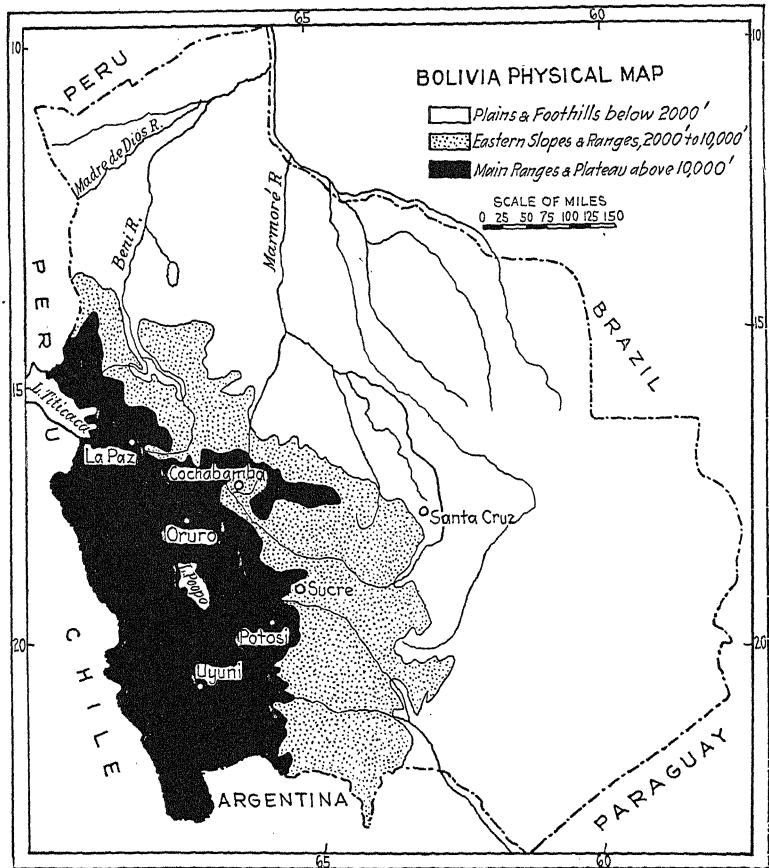


FIG. 59.—Map showing the highlands and lowlands of Bolivia. (Altitudes after Goode.)

THE PLATEAU OF BOLIVIA

Upon the lofty Bolivian tableland live three-fourths of the entire population of the country. Here are the capital, the mining centers the chief cities and towns, most of the railways,

and nearly all of the industrial activities of the nation of $2\frac{1}{2}$ million people. The surface of the plateau is strikingly level and has an area of about 40,000 square miles. At the northern end, extending across the boundary into Peru is Lake Titicaca, the shrunk remnant of a vastly larger lake that once occupied this intermontane valley. Lake Titicaca is 138 miles in length, 69 miles in width, has a maximum depth of 900 feet, and lies at an altitude of over 12,600 feet. It is a fresh-water body, draining southward into the shallow Lake Poopó, which has no outlet, and whose waters evidently disappear by evaporation and by seepage into the great depth of underlying gravels. As previously stated, two steamers of 600 and 1,000 tons, respectively, navigate Lake Titicaca. All parts for these steamers were made in Great Britain, taken to South America, carried over the Andes, and put together on the margin of the lake. The materials for the first steamer had to be transported overland on mule back, for no railway then reached the lake.

The northern half of the plateau receives sufficient rainfall for agriculture, and light crops of barley and potatoes are grown; but the southern half is virtually a desert. The altitude offsets the tropical heat, so that the plateau is cold and bleak in winter and cool in the shade in summer. Driving storms sweep over the plateau and leave it white with snow, while flowers are blooming in the gardens of La Paz in its cañon 1,500 feet below. There are great extremes of temperature from day to night and from sun to shade. One may find the air in the sun warm and delightful, but in the houses or in the shade, entirely too cold for comfort. After visiting the Bolivian plateau, James Bryce wrote that he understood why the Incas were sun worshippers.¹ At times, the winds sweep across the bleak plateau, driving sand before them like a sand blast. It is not a pleasant climate, and that is why the Spaniards built the city of La Paz in its sheltered cañon, and why the people of Bolivia insist upon making it their seat of government, though Sucre is the legal capital.

In the rocks of the plateau are rich deposits of tin and lesser deposits of copper and silver, the extraction of which constitutes the most important industry of the country, and which supply 90 per cent of the export values of the country.

At these high altitudes, the air is thin and man's physiological and nervous system must become adjusted to life conditions

¹ South America: Observations and Impressions, p. 172, 1912.

wholly unlike those of the lowlands. Only the Indians, accustomed throughout many generations to these altitudes, can do heavy manual labor.

The People of the Plateau.—Of Bolivia's $2\frac{1}{2}$ million people, more than half are full-blood Indians; a small fraction, probably less than 8 per cent, are unmixed whites; and the remainder are mestizos, or cholos. There is scarcely any negro blood in Bolivia. In the region about La Paz live the Aymarás, descendants of a subject race of the Inca Empire. They are thus described:¹

The Aymarás (i-mā-rās).—"The normal environment in which the Aymarás lives, and which accounts for his peculiar temperament, is highly unfavorable to human life, when unaided by the resources of modern civilization, which are beyond the reach of the Indian. The Aymarás's existence has been a continuous struggle against the environment of the bleak and inhospitable plateau—against cold and hunger and the lack of oxygen. The hard conditions of life have left little place in him for affection or any other of the finer feelings. One of his strongest sentiments is his ineradicable attachment to the 'ayllu,' the community in which he was born and in which his ancestors lived. So strong is this attachment to his traditional home that he refuses to migrate to the warmer valleys beyond the Andes where the conditions of life are much more favorable. His music is in accord with the dreary circumstances of his life and consists of the melancholy and monotonous minor notes of the 'quina' or reed flute. His few songs are mournful chants that are seldom heard.

"The country-dwelling Aymarás lives in a hut made of mud or stones, where he sleeps on a sheep pelt on the bare floor or on the floor itself. His clothing consists of a peaked woolen cap with long 'ear flaps' that hang down over the side of his face; a homespun woolen poncho, generally of great age; rough trousers split part way up the back of the leg; and crude sandals, which he wears over the rocky roads of the mountain country or the sharp cobblestones of La Paz, but which are generally discarded. His sparse diet is made up of potatoes, usually in the desiccated form known as 'chuno,' a stew made of vegetables and barley, or 'quinua,' and parched corn. He eats little meat or bread, though he may kill a sheep to celebrate a fiesta.

"The Aymarás is the agricultural laborer of the 'altiplano,' though seldom a proprietor, save where the ancient communal tenure has been permitted to survive in some distant localities. He also does the rough work of the city and can always be seen carrying burdens about the

¹ SCHURZ, W. L. *Bolivia: A Commercial and Industrial Handbook, Special Agents Series 208*, U. S. Dept. of Com., 1921.

The description of the Quechuas, following, is from the same source.

streets of La Paz. He cares for the herds and flocks of the plateau and drives the pack trains of mules, burros, or llamas from place to place. He is often the owner of small flocks of sheep or droves of pack animals, whose life he shares in a strange intimacy. Most of the workers in the mines are also drawn from his class. He has no place in the political life of the nation, and sharp barriers of caste separate him from those who own and rule the country. Even the majority of the 'cholos,' who have sprung from a mixture of his race with the Spaniard, look down on him and refuse to speak his language."

Much more numerous are the Quechuas, the most important racial group of the Inca empire, now forming the chief element in the highland population from Ecuador to northern Argentina.

The Quechuas (kěch'-wās).—"The Quechua is smaller in stature than the Aymará, less robust and of finer features, some of the men of the Sucre district being of quite handsome appearance. However, the Aymará 'cholos,' particularly the 'cholas' of La Paz, are generally superior, as regards stamina and appearance, to the majority of the Quechua mixed breeds.

"There is a vast difference in the character of the two races. The Aymará, at the time of the Spanish conquest, had lived under the Incaic dominion only a comparatively short time and still lived in a semi-barbarous state. The Quechua, on the other hand, had long been subjected to the peculiar civilizing régime of the Incas, which had given him certain fundamental elements of culture and a settled order of society, even though it had deprived him of all personal initiative. The Incaic institutions have disappeared, save in the survival of a few customs, but the Quechua still preserves in his temper much of the heritage of pre-Spanish days. He is eminently docile and passive, whereas the submissiveness of the Aymará can never be taken for granted. He, also, is taciturn and uncommunicative but never defiantly or sullenly so. His temper is, in general, much gentler and kindlier than that of the Aymará. However, he has the same propensity for drink, which he shares with the other Indian races of South America. Except in the high mountain districts of Oruro and Potosi, he prefers the milder 'chicha' to the strong liquors that serve the Aymará. This is particularly true in the valleys of Cochabamba and Chuquisaca, where large areas of corn are devoted to the making of 'chicha.' In the city of Cochabamba, there are 1,400 'chicherias,' or shops where 'chicha' is dispensed. This is at the rate of about 1 to 25 persons in the population.

"The Quechua's manner of life varies considerably in different districts. In the valleys of Cochabamba and Sucre, which are the favorite habitats of the race, it is much superior to the conditions in the more

unfavorable environment of the Oruro and Potosi highlands. In the former, he is an agriculturist, working in a good soil and a temperate climate. There he has enough to eat of corn and vegetables and often of meat, and the climate makes few demands in the way of clothing and housing. In Potosi and Oruro, he is a worker in the mines or farms the barren and rocky soil of the mountains. Here his conditions of life are much like those of the Aymará of the La Paz 'altiplano.'

"Like the Aymará, he lives apart from the political life of the republic but is less esteemed as a soldier. Yet with the Aymará, he forms the very basis of the whole economic life of the country."

Agriculture on the Plateau.—A leading Bolivian authority estimates that there are in all highland Bolivia about 10 million acres suited to agriculture, about half of which is actually under cultivation.¹ This means that less land is cultivated in all Bolivia than in a quarter of a state like Ohio. In the northern half of the plateau, the rainfall is about 24 inches a year, falling chiefly from October to March. This is barely enough to support agriculture, and the crops are light. All of the agriculture is carried on by the Indians either for themselves or as tenants on the large estates. The Indians refuse to change their traditional ways of farming, which are worse than mediaeval in their crudeness. Modern implements, except the plow, are practically unknown and wholly undesired. The Indian loves his little piece of land and loves to cultivate the land beyond any other occupation, providing he can do it in his own way.

An American² who lived many years in Bolivia thus describes the Indians attachment to his ancestral lands:

"It is no surprise to find that to the Bolivian aborigine, 'land is the very breath of life.' If he holds it as free property, it is his 'pearl of greatest price.' So dear is it to him that, in time of famine, he will sell his child rather than part with his diminutive parcel of ground. He fences it with a wall of stones or mud. He carefully guards the boulders that mark its bounds. He looks upon every traveler with a suspicious eye for fear the stranger may covet his tiny holdings. If, as is usually the case, the land belongs not to an individual, but to a group of persons who hold it collectively, it is no less dear. Every member of the body is *per se* a defender of its holdings. No greater perfidy can be com-

¹ Señor Louis Crispo, quoted by GEORGE M. McBRIDE, *The Agrarian Indian Communities of Highland Bolivia*, *Am. Geog. Soc. Research Series* 5, p. 23, 1921.

² McBRIDE, GEORGE M. *The Agrarian Indian Communities of Highland Bolivia*, *Am. Geog. Soc. Research Series* 5, p. 3, 1921.

mitted than to violate or fail to support the ancient custom of guarding the common holdings.

"The Indians not only love their land; they cling to it generation after generation. Most of the families have lived on their present holdings from time immemorial. Nothing will induce them to move. There is far more fertile soil in the valleys east of the cordillera. A milder

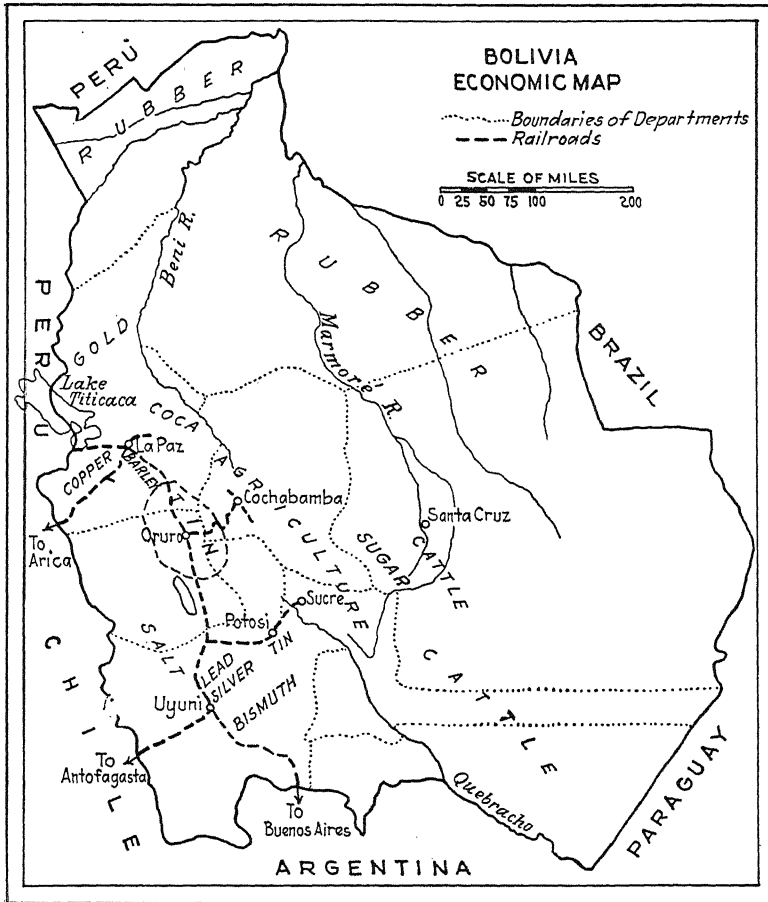


FIG. 60.—Principal producing regions of Bolivia.

climate may be found in the valleys which the Indian traders visit from time to time. But these facts do not entice them to abandon the lands upon which their fathers lived. Even the inducement of good wages in the cities, at mines, or upon the railroads can seldom uproot these devoted farmers from their little plots of ground. Even

if, as often happens, the land be absorbed by an adjoining hacienda, and passed repeatedly from one owner to another, the Indian remains on it, being transferred with the soil. Only by the use of violence and by the demolition of his humble cottage, the destruction of his sheep corral, and the appropriation of his fields, can he be driven from the place. Centuries of occupation have fixed him fast to the soil."

Barley and potatoes, with occasional fields of wheat and oats, are the chief crops of the plateau. Not only are the level lands cultivated, but the mountain slopes also, although terracing is less common than in Peru. So small is the yield that the plateau region does not produce enough food for the population, and supplies are brought up from the eastern slopes and valleys and are



FIG. 61.—Agricultural lands on the Bolivian plateau near Tupiza.

imported from abroad. Bolivia, as a whole, is far from self-sufficient in food production, although it might be if better farming methods were used. Only recently has the government given attention to the improvement of agriculture, and little has yet been done. The Indians and the rural cholos cannot read and, hence, could not be reached by agricultural instruction in printed form if it were attempted. They constitute an inert, unresponsive mass, unwilling to be instructed, and yet by their primitive methods, they are incapable of producing enough food for the nation. The situation presents a strange anomaly: agriculture wholly dependent upon the Indians' labor, yet these same Indians constituting a stone wall against any improvement, and the

nation faced with a food-production problem that the efforts of the next hundred years will not solve. However, the large exportation of minerals provides the means for purchasing such foodstuffs as must be imported.

Transportation on the Plateau.—Bolivia has upwards of 1,000 miles of roads on which automobiles may be used during parts of the year, but only one road of any length is a first-class motor road, and that is a privately built road from the Caracoles tin mines to the railroad, 70 miles. Concrete highways



FIG. 62.—Freight wagons which formerly traversed the route connecting the Bolivian railway line at Atocha with the Argentine railway at La Quiaca. A new railway now makes the connection. (*Copyright Ewing Galloway, N. Y.*)

would cost nearly as much to build in Bolivia as railroads, and there are very few vehicles to use such highways. The greater part of the transportation of goods, other than by railroads, is done by mules, burros, and llamas. Bolivia is too poor to build both good roads and railroads, and railroads are given the preference, and properly so at this stage. In all Bolivia, there are fewer wheeled vehicles than would be found in one small city in the United States.

In the building of railways, Bolivia has made notable progress, when the tremendous difficulties involved are taken into account. This inland country is connected by three railways to the Pacific coast and by a fourth to the railway system of Argentina and thence to the Atlantic (Fig. 60). The total railway mileage is

about 1,300 or 1,400, very nearly all of which is on the plateau. The principal lines focus upon La Paz. The extension of the Southern Railway of Peru by way of Lake Titicaca connects the Bolivian plateau with the Peruvian port of Mollendo, but this route is the least used for Bolivian traffic of the three that reach the Pacific. The shortest route is the Arica-La Paz Railway, 281 miles long. It has frightful grades, and for 22 miles is compelled to use a cog-rail system. But the fact that the route is much shorter than either of the other lines to the Pacific gives

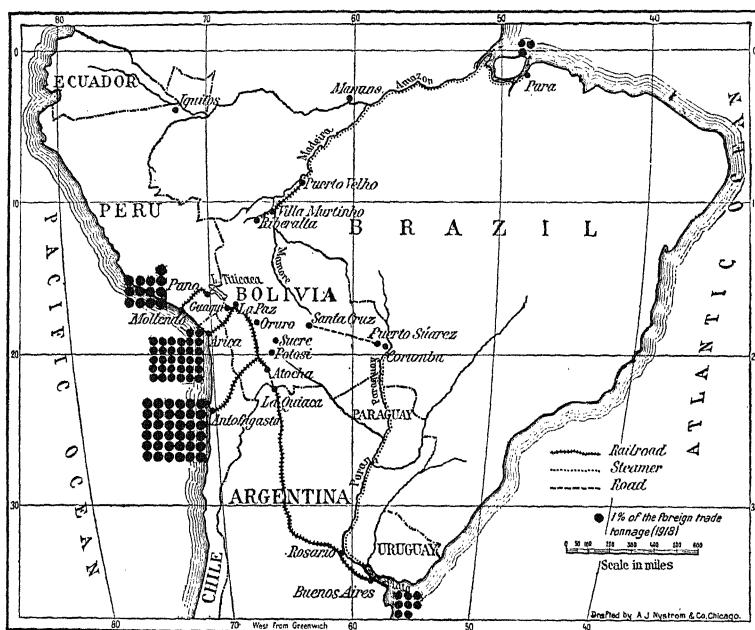


FIG. 63.—Trade routes between Bolivia and the sea. The railway to Argentina has been completed. Each dot represents 1 per cent of the foreign trade (1918). (Courtesy W. O. Blanchard and the *Journal of Geography*.)

it an advantage which is diverting an increasing quantity of traffic to it. In fact, it is, at times, taxed beyond the capacity of its limited equipment, and shippers complain of the long delays.

The longest route is the Antofagasta and Bolivia Railway, a narrow-gauge privately owned British line which obtains a very large traffic from the copper mines and nitrate fields of northern Chile as well as from the tin mines of Bolivia. This line traverses almost the whole length of the Bolivian plateau. Several

lesser lines connect this important railway with cities and mining camps on the plateau and one, completed in 1925, connects with the Argentine system at the boundary of that country, and gives Bolivia an outlet to the Atlantic by way of Buenos Aires. The minor as well as the major railways are shown in Figure 60. The fact that all the overseas commerce of Bolivia must pass through ports belonging to foreign countries is objectionable to Bolivia, but the inconvenience is less than might be expected.

New railways are projected, and two or three are under construction. On the whole, Bolivia is better served by its railways than any other South American country thus far considered.

The Problem of Fuel on the Plateau.—The tableland and high mountains of Bolivia are treeless, and so are the western slopes of the Andes clear down to the sea. Practically no wood for fuel is available, nor is workable coal known to exist in Bolivia or in the parts of any neighboring country readily accessible to Bolivia. Petroleum seepages are common in places, and the evidences of oil were sufficient to lead the Standard Oil Company to expend millions of dollars in exploration and drilling, without satisfactory results, however, up to 1925.

On the plateau itself and on the Pacific slope, there are relatively few streams and little available water power. But on the eastern slope of the Cordillera Real, there is heavy rainfall and enormous potential water power which can be converted into electrical energy and transmitted to the mining camps. Electric smelting of ores has not yet proved economical. Clearly the plateau is seriously deficient in fuel. Even *taquia*, the dried dung of the llamas, is widely used for domestic fuel, for steam boilers, and even for small smelters. For example, the Corocoro Copper Company has used 10,000 tons of *taquia* a year, paying the Indians \$4 a ton for it.

The second local source of fuel is the *yareta*, a woody, resinous mass of fibers resembling enormous fungi; this grows on the rocks, and is gathered, dried, and sold by the Indians. Large heaps of it may be seen piled along the railways at the stations on the plateau. Imported coal costs \$40 to \$50 a ton at the mines in Bolivia.

The City and Department of La Paz.—The capital city of La Paz has the most unusual setting of any city in South America. In a recent geologic period, a river cut a profound gorge or gulch in the deep gravels that fill the valley south of Lake Titi-

caca. The modern successor of that stream now flows through the city and eastward to a branch of the Amazon. The gorge, 1,500 feet deep at La Paz, is still deeper farther downstream and has a width of 2 miles or more. On nearly all sides of the city, the partially cemented gravels stand in pinnacles, towers, and massive walls of striking colors. The railways that wind and loop their way from the plateau down to the city constitute two of the most expensive pieces of railway building in Bolivia.

At an earlier date, Sucre was made the legal capital of the republic, but its out-of-the-way location has caused it to be replaced by La Paz which is the actual capital. Lying in its sheltered and sunny valley, La Paz has a much more agreeable climate than is found on the wind-swept plateau.

La Paz is politically, socially, intellectually, and financially the center of the country and the focus of its transportation lines. Founded by the Spaniards in 1548, the city has grown slowly to a population of about 100,000. It has trolley cars and electric lights, a telephone system, water works and fairly well paved main streets. The University of La Paz has several hundred students, most of whom are enrolled in law and medicine. There are also five departmental colleges, only one or two of which enroll as many as 100 students. La Paz has a few small manufacturing establishments, and as a mercantile and trading center, it ranks first in the republic.

THE MINING INDUSTRY

✓ TIN

The Rise of Tin Mining.—Bolivia now ranks second only to the Straits Settlements in southeastern Asia as a producer of tin. For more than 300 years, the famous silver mines of Potosi were among the wonders of the mining world, but their silver lodes had been so thoroughly worked out by 1895 that it became necessary to consider what should be done. The Antofagasta and Bolivia Railroad reached the center of the plateau in 1892 and made it possible to ship out ores of lower value than those of silver or gold. Moreover, the rapid advance in the use of tin created an expanding market for that metal. It had long been known that tin ores existed in the Potosi region, and about 1895, the mining of these ores began in a serious way. By 1900, the region was producing 16,000 tons of tin bars and concentrates a

year, and in 1925, the exports exceeded 60,000 tons of concentrates, containing 35,000 tons of pure tin. Bolivia is producing nearly a quarter of the world's annual supply of new tin, and

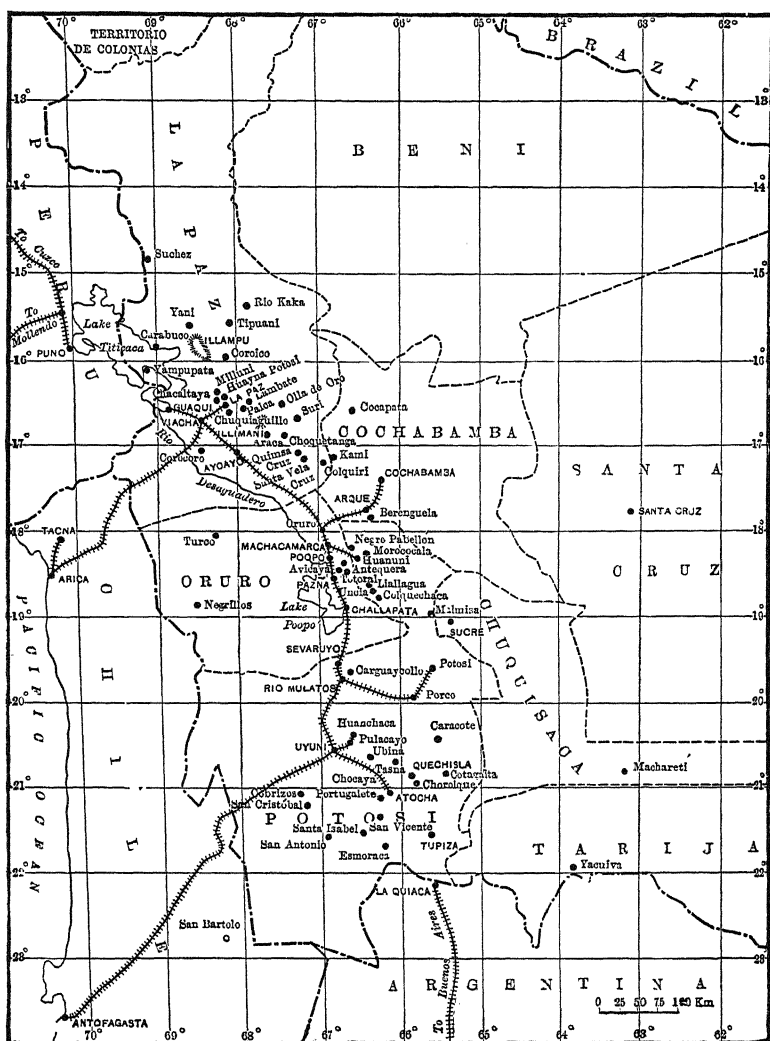


FIG. 64.—Map of Bolivia showing location of mining districts. (Not including extreme northern and eastern unmineralized parts.) Mining localities with initial capitals, other localities all capitals. (*Miller and Singewald.*)

this single item not only exceeds all other Bolivian mineral products combined, but it constitutes 65 to 70 per cent of the

value of the country's total exports. Tin mining has become the dominating economic interest of the republic. One of the wealthiest men in all South America is Simon Patiño, the "tin king" of Bolivia who rose from poverty to great wealth through the fabulous profits of his tin mines originally obtained at a trifling cost. In 1924, an interest in his great properties was bought by an American corporation.

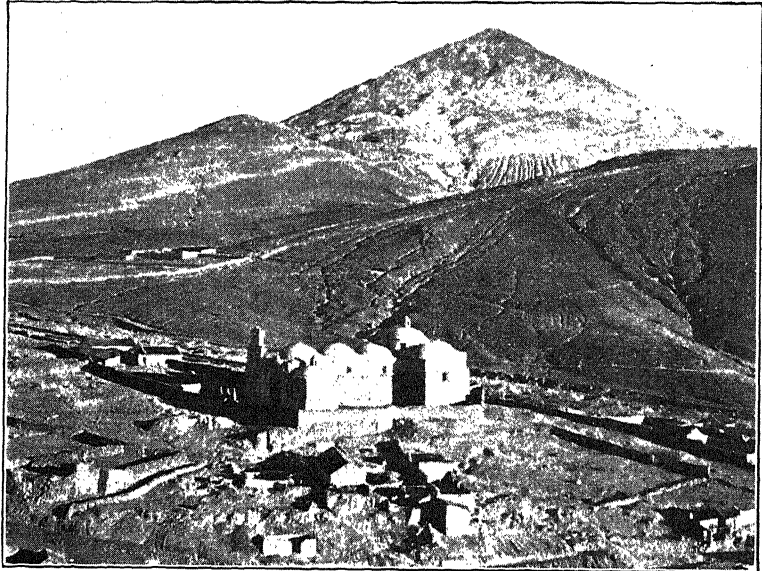


FIG. 65.—Region of Potosí, once the foremost silver-producing region of the world. Now a leading tin-mining center. (Copyright Ewing Galloway, N. Y.)

Character and Location of the Tin Deposits.—The tin ores of Bolivia are intimately associated with other minerals, notably those bearing silver and pyrite, and others bearing copper, lead, tungsten, and bismuth. The tin deposits are confined to the eastern range of the Andes, known as the Cordillera Real. Strangely enough, the rich tin ores extend practically to the Peruvian boundary on the north and to the Argentine boundary on the south, but up to date, no valuable tin deposits have been located beyond the boundaries of Bolivia. During a geologically recent epoch, intrusions of igneous rock forced their way upward into the overlying rocks and brought about the concentration of tin-bearing ores in both the older rocks into which they intrude

and also in the igneous rocks themselves. The tin is found in mineral veins that branch and penetrate the surrounding rocks in all directions and often form a complex network of large and small veins, some of which attain a width of 5 feet or more. The famous Cerro of Potosi has become honeycombed with galleries from which the silver ores were removed at an earlier date, and from which tin ores are now being taken. At one time, this mountain had 742 mine entrances leading into the maze of galleries.¹

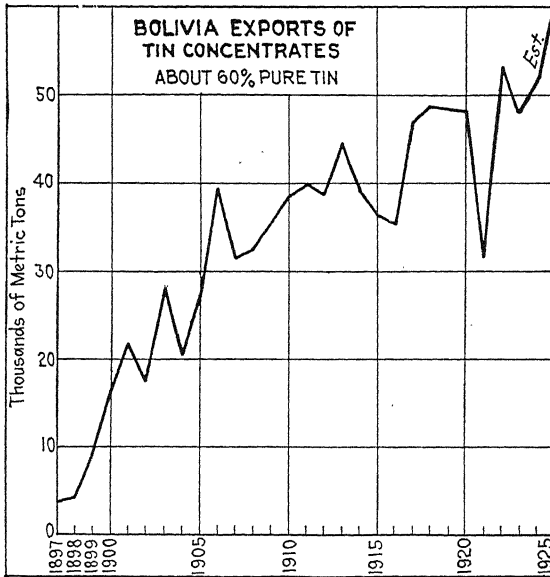


FIG. 66.—Practically all of the tin mined in the western hemisphere is mined in Bolivia.

The richer ores carry 6 or 8 per cent tin and even more, but the average is nearer 3 per cent. They lie near the surface but also extend to an unknown depth below. The deepest working extends downward less than 1,000 feet. There are upwards of 25 districts which are producing tin, but most of the ore comes from a few properties. The most valuable of these are in a mountain (Cerro de Llallagua) south of Oruro. These two groups of workings have produced upwards of half the tin mined in Bolivia. Another large and excellently equipped property belonging to an American company is at Caracoles, about midway

¹ See MILLER and SINGEWALD, *Mineral Deposits of South America*, p. 122.

between La Paz and Cochahamba. At times the tin ores have been smelted largely at Perth Amboy, N. J., but owing to lower smelting costs in Great Britain, more of the ore goes there. Very little smelting of tin is done in Bolivia, mainly because of the high cost of fuel; before shipping, the ores are concentrated so that they consist of about 65 per cent pure tin.

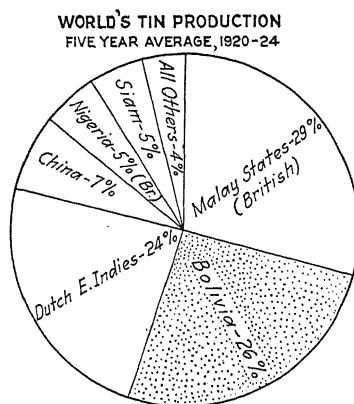


FIG. 67.

Several years ago, the average cost of producing and marketing a ton of tin concentrates as reported by two typical mines in Bolivia was as follows:¹

	PER TON
Mining and conveying to concentrating mills.....	\$4.78
Sorting and handling.....	0.48
Milling and assaying.....	1.51
General expenses.....	0.36
Cost of production.....	\$7.13
Railroad freight to Guaqui on Lake Titicaca.....	35.88
Railroad freight from Guaqui to the port of Mollendo....	10.14
Ocean freight from Mollendo to Europe.....	7.80
Cost of transportation to smelter.....	53.82
Export duties.....	15.60
Commissions, insurance, etc.....	10.92
Total cost laid down at smelter in Europe.....	\$80.34

In the above table, three facts stand out prominently: (1) the extremely *low* cost of production of tin concentrates, \$7.13; (2)

¹ WILSON, OTTO. *South America as an Export Field*, *Special Agents Series* 81, p. 59, U. S. Dept. of Com., 1914.

the very *high* cost of transportation to the coast, \$46.02; and (3) the relatively low cost of ocean transportation, \$7.80. Sixty-six per cent of the total cost at the smelter is due to the relatively short haul by railway to the coast.

MINERALS OTHER THAN TIN

✓**Silver.**—The silver mines of Potosi, Bolivia, have yielded more than 1 billion dollars of silver since they were discovered nearly 400 years ago (1545).¹ This enormous output places the Potosi group of mines in the position of the greatest silver producer in the world. These mines were one of the largest sources of wealth in all the Spanish colonies. They were worked in the colonial days by forced Indian labor, and the ores were taken some 300 miles to the Pacific on the backs of men and mules. Some were also taken 800 miles overland by mule or ox cart to the Paraná or Paraguay rivers and shipped thence to Spain. Other mines in Bolivia yielded upwards of a half-billion dollars in silver, making a total for the country of nearly 2 billion dollars. So rich in silver were these surface ores that even with the crude methods of mining then in use, they yielded fabulous profits. Tin was constantly encountered in the silver-mining operations, but it had no value at that time and in that place, and the tin ores were thrown upon the dumps as worthless.

Bolivia is no longer an important source of silver, yielding only about 2 per cent (3 million dollars) of the world's output as compared with about 30 per cent each produced by both Mexico and the United States. The Americas yield 85 or 90 per cent of all the silver mined in the world.

✓**Copper.**—At various places in the Andes, bodies of copper ore exist. The Cerro de Pasco region of Peru has already been referred to; and in Chile are found two of the largest copper-yielding regions of the world, Chuquicamata and El Teniente. Thus far, however, no copper-ore body of such magnitude has been found in Bolivia, but many smaller ones are known. The most important producer is at Corocoro, on a branch of the Arica-La Paz Railway. This deposit yields native or pure copper. Most of Bolivia's output comes from this region, but the total production averages only about 2 or 3 million dollars a year, a small fraction of the value of Bolivian tin. Since the World War, the copper mines of the world have been able to produce more

¹ *Special Agents Series* 81, p. 58, U. S. Dept. of Com., 1914.

copper than has been needed, and many mines in the United States have been unable to produce at a profit at the low prices that have prevailed. There has been little incentive, therefore, to develop new copper mines in Bolivia or elsewhere.

Miscellaneous Minerals.—Lead, zinc, gold, antimony, tungsten, and a number of other minerals are mined in Bolivia, but the lack of cheap transportation, the scarcity of labor, and the high cost of fuel and supplies, all tend to retard the mining of any but very rich ores, or less rich ores at times of high prices. Most of the world's supply of the metal bismuth comes from Bolivia where it is nearly all produced by a single company. Bismuth is valuable chiefly because of the easily fusible alloys which it forms with lead and tin. These alloys melt at such low temperatures

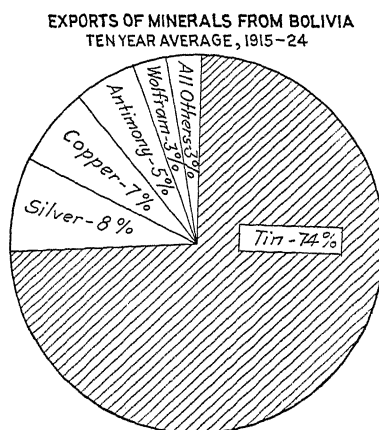


FIG. 68.

that they are employed in making safety fuses in electrical apparatus, safety plugs for boilers, and automatic fire-extinguishing sprinklers. The metal is also of value in medicine.

Summary of the Mineral Industries.—Mining is the dominant interest of Bolivia and is virtually confined to the plateau. Most of the laborers in and around the mines are Indians who devote a part of the year to the cultivation of their crops. The geological conditions and the known ore deposits warrant the prevailing belief that the mineral resources of the country are very large. Coal and iron are, however, practically absent, and expensive efforts to locate paying oil fields in eastern Bolivia have not yet

been successful. The absence of fuel at reasonable cost is one of the drawbacks to mining development. The labor situation is unusual. Only the Indians, accustomed through generations to the high altitudes, can be used for manual labor. Apparently, the future mining development of Bolivia is limited by this factor of Indian labor. A third factor is the difficulty and excessive cost of building railroads. Trunk lines to the coast already exist, however, and branches will be extended to other rich ore deposits as they already have been to Potosi, Uncia, and Corocoro. So far as mining is concerned, one major problem was solved when the railways to the coast were completed. Railroad rates are still very high, but can be reduced if the volume of traffic is largely increased.

Securing the necessary foreign capital for the development of mining properties hinges mainly upon the attitude of the government toward foreign investments. Capital will go into Bolivia in any quantity necessary if the laws and their administration are just, and if a stable government is maintained. On the whole, foreign capital has been favorably treated. If petroleum in large quantities shall be found, as is generally believed probable, the fuel difficulty will be partly met. The problem of the future labor supply can only be met by a larger use of mechanical appliances, and by a wiser attitude with regard to the conservation and uplift of the Indian population.

LIVE STOCK IN BOLIVIA

Cattle and sheep of inferior quality are raised in various parts of Bolivia, but even the approximate number is not known. The sheep are raised on the plateau and the bordering highlands. Fleeces, when washed, weigh only about 2 pounds instead of the usual 4 or 5 pounds. The sheep are sheared once in 2 or 3 years, and this may be done with a piece of broken glass. So stubbornly do the Indians resist any innovation that they not infrequently refuse to use sheep shears when offered them.

Alpacas are fairly numerous, and llamas are believed to number at least 500,000. The llamas of the high Andes are the cheapest carriers known. They live on next to nothing and their owners can underbid the railways in carrying products. Thousands of them may be seen carrying bags of ore from mines to mills or to railways. Their wool is much used by the Indians.

THE EASTERN SLOPES AND PLAINS

The Eastern Plains.—More than half of the area of Bolivia is included in the foothills and plains of the Amazon and Paraguay rivers. A section in the southeast is in disputed ownership between Paraguay and Bolivia (Fig. 4). A large part of this section is dry country, covered with grass and scrub, somewhat used for cattle grazing but very sparsely populated. The two large departments of Santa Cruz and Beni are partly forest and partly park land where great herds of wild cattle pasture.

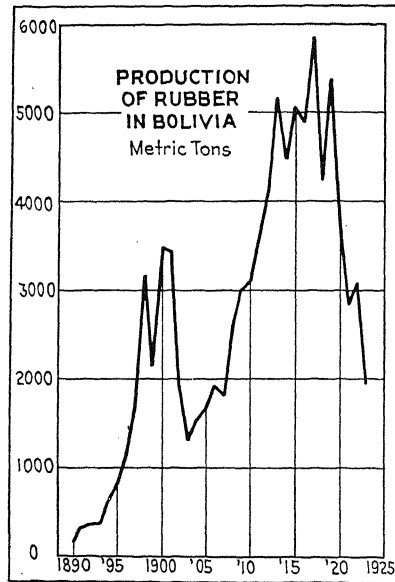


FIG. 69.

Beni and the Territory of Colonies contain extensive rubber forests and have supplied most of the rubber which has been exported from Bolivia. The high point of exportation was reached in 1917 (over 6,000 tons), but the high point in value was reached in 1910, before the great drop in price which was caused by the competition of plantation rubber from the Far East. The recent production of rubber in Bolivia has been only about one-third as great as it was in 1917. The Amazon plains are low, wet, and jungle covered, and are of little present value.

The Yungas Region.—The country of heavy rainfall and forests on the eastern slope of the Andes, usually called the *Montaña*, is called the Yungas in the region east of La Paz. The valleys and slopes lying between the altitudes of 5,000 and 8,000 feet have a delightful temperature and abundant moisture, and are excellently suited to semi-tropical agriculture. Much of the land is held in large estates, small parts of which are worked by Indians under major-domos employed by the owners to manage the estates. The larger haciendas have a half million acres and more, but only a very small fraction of the land is under cultivation. Agriculture is almost the only occupation in the Yungas,



FIG. 70.—Terraced mountain slopes in the Yungas of Bolivia. On these terraces the coca shrub is grown.

but it is carried on by the same inefficient and antiquated methods that prevail in the Andes. The small local market for farm products leads to the cultivation of those products for which there is an active demand among the Indians and cholos, who make up most of the population. The main crop of the Yungas, and almost the only one to which serious attention is given, is the coca shrub. This is planted in terraces (Fig. 70) on the mountain sides and is grown for the leaves from which cocaine is made. The greater part of the coca leaves, however, are used directly by the Indians, who chew coca almost universally.

Small quantities of coffee, cacao, sugar, cotton, and other warm-climate products are grown in little patches. Well-beaten trails connect the valleys of the Yungas with La Paz and other parts of the plateau, and a relatively active trade is carried on. It is reported that 5,000 mules a day pass along the main road between La Paz and the Yungas. The delightful climate, marvelous scenery, and great potential productivity of this region lead Bolivians to regard it as the future garden spot of the republic. But its remote situation and difficulties of access must delay its development. A narrow-gage railway is slowly building from La Paz toward the Yungas and will eventually assist in opening up the region.

The Department and City of Cochabamba.—The Department of Cochabamba is, next to La Paz, the most populous in Bolivia, and the city of Cochabamba is second in population only to La Paz. The department includes parts (1) of the plateau, (2) of the lofty Cordillera Real and its eastern slopes, and (3) of the densely forested plains of the Amazon Valley. The city was one of the earliest founded in Bolivia by the Spaniards and is regarded as having an exceptionally fine climate, lying as it does at an intermediate altitude. Its population of 40,000 people is largely Indian and cholo, but includes also a fair proportion of whites. It is connected with the main line of the Bolivian Railway at Oruro by a recently completed railroad, and two electric lines connect the city with other towns in the region. The department has more miles of roads that can be used by motor cars than any other in the republic, and regular motor-bus service is maintained over some of these roads during the dry season.

Agriculturally, Cochabamba is the leading department of Bolivia, and has the largest population to the square mile. Because of the exceedingly wide range of altitude and rainfall, almost every known crop can be grown somewhere in the department. Several thousand acres are under irrigation during the dry season. Corn is the leading crop in the Cochabamba Valley, and three-fourths of it is used in making an alcoholic drink (chicha) of which the Indians and cholos are very fond. From both sugar cane and grains, alcohol is made to the extent of 70 million quarts a year in the single department of Cochabamba. The Indians are exceedingly fond of alcoholic drinks and welcome feast days, which both men and women celebrate by getting drunk.

In 1919, there were 1,500 chicha-making places in the department, and 1,400 chicha-selling places in the single city of Cochabamba. Every city and town abounds in liquor-selling shops. Drunkenness among the Indian laborers in the mines is such an evil that prohibitory regulations have been put into operation in the leading mining centers.

A small quantity of wheat is grown, and is cut with the sickle and threshed by driving oxen over the straw, as is customary throughout the Andes. It is mostly ground into coarse flour in small water-driven mills of crude construction. Modern mills exist in the cities of Cochabamba and Sucre. Barley is the chief cereal of the drier lands, especially on the plateau. It is mainly used for making beer in breweries located in the larger cities. Cochabamba has a brewery that markets a million bottles of beer yearly.

Petroleum.—Oil seepages and also the finding of oil by drilling have led to the belief that petroleum in paying quantities exists in eastern Bolivia. Up to 1925, practically no oil had been produced, but active exploration and drilling were in progress. The efforts to develop these petroleum resources illustrate well the important part that capital and experience must play in great industrial undertakings, and indicate how essential to the development of the resources of South America are the capital and experience that have already been acquired in more advanced countries.

The first serious efforts to locate and develop the oil resources of Bolivia were made by a Bolivian syndicate which was able to provide upwards of a million dollars. But even this large sum made only a beginning, and the syndicate had to seek financial aid abroad. In the course of time, the promised aid was secured, and \$200,000 more was invested, when the project collapsed because of lack of funds. Another effort to secure capital in Europe was made, and a third company entered upon the project of finding and producing oil in Bolivia. This effort also failed, and a fourth company (foreign) was organized to take over the undertaking. It proceeded a short way in the work when its funds ran out, and again the enterprise stopped. Various men and groups of men who had interested themselves in Bolivian oil now controlled about $3\frac{1}{2}$ million acres of prospective oil lands in eastern Bolivia, but did not have either the capital or experience necessary to carry forward the expensive enterprise. Finally, the

Standard Oil Company (of the United States) acquired the rights and interests of the larger of these stranded companies, made a contract with the Bolivian government for 55 years, and, with its enormous capital, experience, and organization, began systematic exploration and drilling in this remote region hundreds of miles from railway or deep waterway. The undertaking cost millions of dollars, and up to 1925 had not resulted successfully. But this company, unlike the earlier ones, has the resources necessary to carry forward an enterprise until the possibilities of this field are thoroughly tested. If oil is found in quantities, many millions of dollars more will be required to build storage tanks, pipe lines, pumping stations, shops, roads, railroads, quarters for the employees, and other necessary equipment for carrying on a large

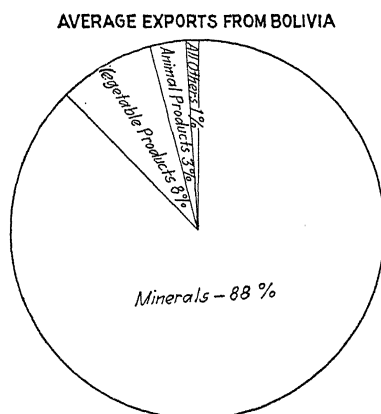


FIG. 71.

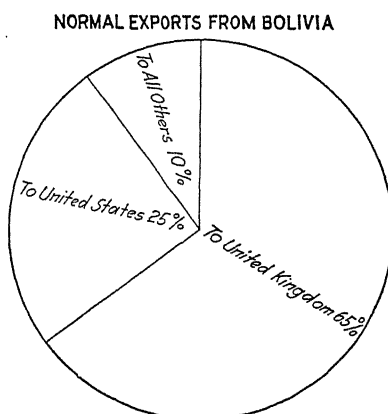


FIG. 72.

undertaking in a region far distant from the beaten paths of commerce. If oil is not found in paying quantities, this wealthy corporation will absorb the losses into its world-wide activities, and its stock holders will never be conscious of the loss. Such is the part that capital plays and must play if the mineral wealth of South America is to be made available for mankind.

FOREIGN COMMERCE OF BOLIVIA

Only in Chile do minerals form such a large proportion of the exports as they do in Bolivia. In value, they constitute from 85 to 90 per cent of the total, and tin alone makes up more than 65 per cent, followed by silver and copper. Rubber, wool, hides,

and coca are minor items of export. The two chief buyers of Bolivia's products are the United Kingdom and the United States, the former country usually leading by a wide margin.

The buying power of the people of Bolivia, as a whole, is small because of the great proportion of Indians and cholos who cannot afford and do not yet desire imported goods. Flour, cotton goods, and mining machinery are leading imports; the total value of importations is considerably below that of exports, leaving a favorable balance of trade with which to meet the interest on the growing foreign debt. The United States supplies more of the imports than any other country but takes only a small part of the exports.

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CHAPTER VII

CHILE: THE COUNTRY AS A WHOLE AND ITS NORTHERN MINERAL REGION

PHYSICAL FEATURES AND THEIR INFLUENCE

Influence of the Shape of the Country.—The shape of Chile is unique, for the country has a length of 2,600 miles and an average width of only 110 miles. The unusual shape of the country as a political unit grows out of historic and physiographic causes. The desert of Atacama at the north separated the Spanish colonial settlements in Peru from those which grew up farther south in the Valley of Chile; and this separation foreshadowed that whenever the Spanish colonies should become independent nations, this desert would separate two of those nations. Following the same logic, the main range of the Andes, another natural barrier, became a boundary between the west-facing settlements of Spain on the Pacific coast and the east-facing settlements that grew up around the estuary of the River Plate.

The main range of the Andes was accepted from the beginning of the independence of Chile and Argentina as their boundary, but it was not until 1902, that the award of King Edward of Great Britain determined the exact line of the international boundary. In the main, then, Chile's peculiar shape is the logical outgrowth of its unusual physical features.

The shape of Chile might seem to be a disadvantage to the economic development and to the safety of the country, but under all the conditions as they exist today, it does not seem that it is such. Natural influences, such as a genial climate and fertile soil, have concentrated the population of Chile in the Central Valley, which occupies only 600 miles of the 2,600 of the country's total length. The arid region that forms the northern portion of Chile is somewhat detached from the Central Valley, and under conceivable circumstances might be drawn into sympathetic relations with Peru or Bolivia if either of those countries could offer better protection or greater commercial advantages

than Chile offers. But such is not the case and probably never will be. Chile is the stronger and more progressive nation, and this fact is likely to hold the northern desert, with its great mineral wealth, firmly under Chilean domination. The southern third of Chile is a mountainous, rain-drenched, forest-clad land in which few people will care to make their homes for a long time to come. The only country that touches this region is Argentina, and it is scarcely conceivable that Argentina or any other country will covet this strip of land. If Chile had powerful and greedy neighbors, the shape of the country might cause concern, but the excellent army and navy and the longitudinal railway combined with the natural defenses seem to guarantee full safety.

Coast Line and Harbors.—Half of the west coast of South America belongs to Chile, and the northern two-thirds of the Chilean coast has not a single well-protected harbor. The southern third of the country has undergone a sinking which has transformed the coastal mountains into islands and the valleys into straits and channels. In this part of Chile, protected harbors are numerous, but there is little commerce, for the back country is undeveloped and much of it unexplored.

Chile has about 50 ports which regularly carry on ocean commerce, coastwise or foreign; but only the ports in the southern third of the country have sufficient natural protection from storms to entitle them to be called harbors. Of the ports regularly used for foreign commerce, Talcahuano, near the city of Concepcion, is the best protected by nature, but it is too far south to serve the populous part of the valley. Valparaiso is the principal port and receives more than half of the total imports of the country, but it is unprotected from the westerlies and at times of storms, the transfer of cargoes from ships to lighters or lighters to ships is difficult or impossible. A similar condition exists along the entire Chilean coast from Valparaiso northward, and on the frequent "surf days," no transfer of cargo is attempted in most of these ports. It is noticeable that the great majority of the ports are located on the northern side of small promontories or projecting points of land which afford a little protection from the prevailing winds. Ships usually anchor some distance from land and load or unload freight and passengers by means of lighters and launches. This involves delays and added cost, but it does not appreciably diminish the volume of Chilean commerce. If certain of these harbors were spacious

and well protected, they would draw to themselves a greater part of the ocean commerce of the country, but they probably would not increase the total commerce. Good harbors are unquestionably an advantage, for they expedite and protect shipping operations. Chile well might wish for a coast line with good harbors, but there is no evidence that, in and of themselves, they would greatly increase the commerce of the country.

✓ **The Geographical Regions.**—Chile is a ribbon of land between the ocean and the crest of the Andes. It contains three well-defined geographical regions:

- ✓ 1. The northern mineral region.
- ✓ 2. The central agricultural valley.
- ✓ 3. The southern forest and grazing region.

1. In the dry and mountainous northern half, between the coast range and the main Andes, there is a poorly defined valley, much interrupted by mountain spurs and peaks. Here, in a strip some 450 miles long, are the famous nitrate beds scattered over the "Pampa." The extreme northern end of Chile contains no nitrate beds, however, and the controversy between Chile and Peru over the disputed provinces of Tacna and Arica has not involved the possession of nitrate lands, for those were definitely taken by Chile after the War of the Pacific in 1879–1883. The southern end of the nitrate zone is near Chanaral, some 600 miles north of Santiago. The intervening region is very mountainous, but contains a few valleys where irrigated crops are raised and where live stock is kept. The Central Valley does not become well defined until the latitude of Valparaiso is reached. The mountainous character of this northern half of Chile, combined with the very low rainfall, excludes nearly all forms of industry except mining; but the minerals are so important that the adverse influence of the mountains and desert is offset by the mineral wealth which exists there. A desert climate and a mountainous topography, which ordinarily are unfavorable to man's activities, have here become favorable influences in the country's production of wealth, for the soluble nitrates would long since have disappeared in a moist climate. As pointed out elsewhere, nearly half of the revenue collected for the support of the Chilean government is derived from the export tax on nitrate and the largest mining center in South America is the great copper camp at Chuquicamata, in the heart of the northern desert.

2. The second geographic province of Chile is the Central Valley, or Vale of Chile, already mentioned. This valley (Fig. 84), between the low coast range and the lofty cordillera, together with the adjacent coast, contains about 90 per cent of the inhabitants of the country. It is this agricultural valley that makes possible a real nation.

3. Still farther south lies the third geographical region, the deeply indented, island-fringed coast, flanked by forest-clad mountains. It is too wet and rugged and disagreeably cold in winter to attract settlers, but its wealth of timber will some day give rise to larger lumbering interests.

The economic life of Chile is peculiarly affected by the highly accentuated features of its topography, so different from the plains of its neighbor, Argentina, on the opposite side of the Andes.

Influence of Climate.—Chile extends from latitude 18° to 56° S., a distance of 38 degrees. The northern end of the country lies within the tropics, and the southern point is in a latitude 7 degrees higher than the northernmost part of the United States, not including Alaska. Moreover, in altitude, the land reaches from sea level to mountain tops wrapped in perpetual snow.¹ Thus does Chile have so great a range of temperature that it is able to raise nearly every crop known to man. As a matter of fact, however, the tropical portion is so dry that nothing can be grown without irrigation, and the great scarcity of water restricts even this to a few narrow strips along mountain streams.

The rainfall in the north and south differs as widely as the temperature, for it ranges from next to nothing in the desert of Atacama to upwards of 100 inches in the mountains of the south. In the Central Valley, the rainfall is moderate but comes mainly in the winter months (Fig. 8). In the northern end of the valley most of the 20 to 25 inches of rain falls in the winter months of May, June, July, and August, while in the southern end, rains are frequent every month of the year but very heavy from April to September, inclusive.

The abundance and excellence of the grapes that are grown, the wide variety and high quality of other fruits, the specialization in wheat as a field crop, and the great sheep-raising interests of the far south are all a direct response to the climatic peculiarities of the respective regions, as they are the world over. On

¹ Mt. Aconcagua is 22,812 feet high.

account of its great variety of climate, Chile is, or might be, a nearly self-sufficient country, so far as food production is involved.

A more significant influence is that of the climate upon the characteristics of the people. Throughout the west coast of South America, the characteristics of the indigenous Indian races have had much to do in determining the character of the present population, for the great majority of the people north of Chile and a very large number in Chile have Indian blood and manifest traits of their Indian ancestors. In the tropical lands, the conquering Spaniards found it easy to reduce the Indians to virtual slavery and to use them as laborers. Consequently, large numbers of Indians remain, and there is a generous admixture of Indian blood in the mestizo population. These countries are more largely Indian than Caucasian, although the Caucasian element rules. In South America, as elsewhere, the native tropical races have lacked sustained fighting spirit and have become the servants of the conquerors.

In Chile, however, the Spaniards encountered not a docile people, but one of the most virile and warlike Indian races of the Americas—the fierce Araucanians. Again and again throughout more than 300 years, these unyielding warriors defeated the invaders; but their personal courage did not make up for the inferiority of their arms, and gradually they were pushed southward. Finally the white man's military science, but still more the white man's liquor, conquered, and in 1882, a treaty was made with the Araucanians under which they have submitted to Chilean rule. Some of this fighting blood of the Araucanians has worked its way through intermarriage into the veins of the present Chilean people and partly, though not wholly, accounts for the aggressiveness and military tendencies, so evident in the Chileans. The long struggle between the whites and the Araucanians reduced the numbers of the Indians, but their fierce spirit prevented their being reduced to servility as the natives were in tropical South America. The result is that the whites have not learned to depend upon Indian labor in Chile to the same extent that they have in Bolivia, Peru, and Ecuador; and the stimulating qualities of their own climate have aided in making the Chileans a vigorous people, fond of activity and unafraid of work. Thus has a variety of influences, growing directly and indirectly out of the climate, contributed to the formation of the energetic Chilean character. So marked is

this difference between the peoples of tropical and those of temperate South America that there is no room for doubt that climate is a leading cause.

LAND UTILIZATION

The Limited Extent of Farm Land and of Cultivated Land.—Of the 289,796 square miles of land in Chile, about one-fourth (50 million acres) is classed as actual or potential farm lands, available for crops or pastures. By way of comparison, it may be pointed out that this is more farm land than the Japanese Islands contain, and more than the actual acreage included in farms in California. However, less than 2 million acres, or between 1 and 2 per cent, are actually in farm crops as compared with 6 or 7 per cent in pastures. Illinois, for example, has more than ten times as much land under the plow as Chile has.

In considering agriculture, the first noteworthy point is the small percentage of the land of the country that is actually used for crops and pastures. This is the result of three main causes: (1) the lack of rainfall in the North, the excessive rainfall of the South, and the dry summers in the Central Valley; (2) the exceedingly mountainous character of the country; and (3) the small population and large land holdings, with the consequent incomplete utilization of the land which might be put to agricultural use. Chile is capable of greatly increased production of food-stuffs, certainly as great as Japan or Italy, with their large populations and high standing as world powers.

Agriculturally as well as physiographically, Chile must be divided into three portions: (1) a northern third, which is almost totally desert; (2) a middle third extending from Santiago southward to Valdivia, the northern half of which has a moderate rainfall in the winter, but which depends much upon irrigation; and (3) a southern third made up of mountains and islands. It is evident that such agriculture as is practiced must be carried on in the middle portion of the country, the rich Valley of Chile, the only extensive agricultural area on the west coast of South America.

THE NORTHERN MINERAL REGION

THE NITRATE INDUSTRY

Location and Nature of the Nitrate Deposits.—In 1879–1883, Chile was victorious in the War of the Pacific against Peru and

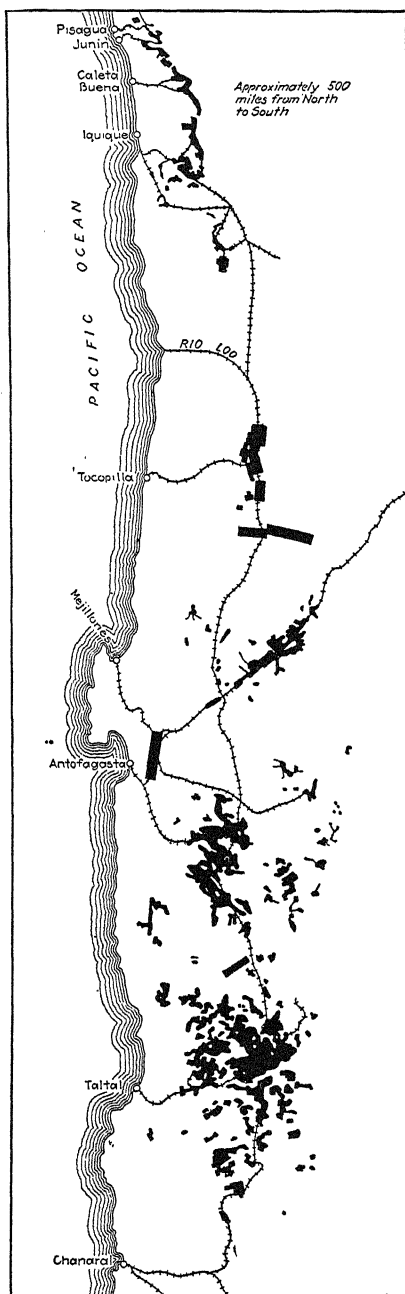


FIG. 73.—Nitrate fields, railways and shipping ports of Chile. (*Engineering and Mining Journal*, Jan. 12, 1924.)

Bolivia and, as an indemnity, took from Bolivia its only strip of sea coast, and from Peru a portion of its southern coast lands. In this acquired territory and south of it are the world's only known deposits of nitrate of soda. They extend from latitude 19° to 27° S., a distance of about 450 miles. They lie at altitudes ranging from 4,000 to 9,000 feet in an irregular belt from 5 to 40 miles wide in the "pampa" between the coast range and the main Andes. The beds are not continuous but are most irregularly distributed, as may be seen from Figure 73. Within a given deposit, the nitrate-bearing layers may vary in thickness from a few inches to many feet, may lie at the very surface of

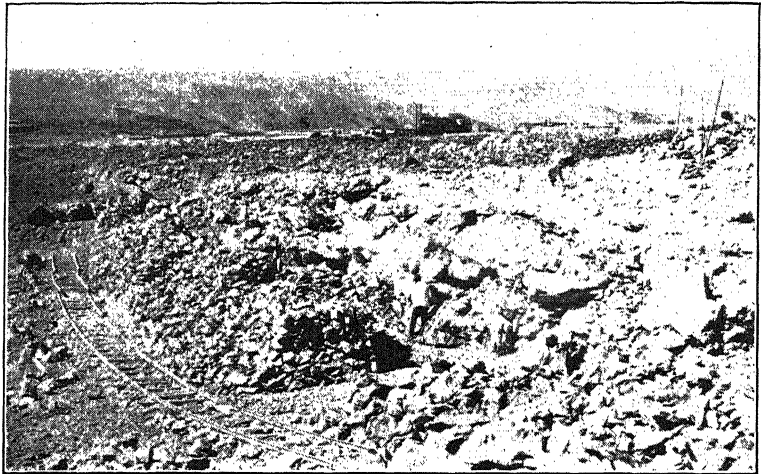


FIG. 74.—Nitrate workings in the desert of northern Chile. (Courtesy W. R. Grace and Co.)

the desert or as much as 25 feet below, and may carry all the way from a mere trace of nitrate up to as much as 40 per cent.

The nitrate exists as a cementing material in the rock waste which, in the geologic past, has been eroded from the mountains and carried down into the valley between the ranges. Whence the nitrate came and why it is here are questions still unanswered,¹ but it clearly was brought by percolating waters and crystallized in the upper layers of the loose sand and gravel where it has been preserved by the extreme dryness of the region.

¹ For discussion of theories of origin and accumulation, see MILLER, B. L. and SINGEWALD, J. T., *The Mineral Deposits of South America*, pp. 293–296. 1919.

So firmly does the nitrate cement these materials that they are resistant rocks and usually require explosives to break them up. The richer of the nitrate-bearing layers are termed the *caliche*. As a rule, only deposits which contain upwards of 12 per cent nitrate are worked, and double this percentage is desirable.

Importance of the Nitrate Deposits to Chile.—By far the most valuable of the mineral resources of Chile are her extensive beds of nitrate of soda, or nitrate, as the salt is called in commerce. For many years, it has constituted more than half of the total exports of the country, and the export tax on nitrate (about \$10 per ton) collected by the Chilean government, has formed not only the largest item in the revenue of the nation, but at times has exceeded all other revenues combined. There is no other important country where national revenues come so largely from a single source as is the case in Chile. The economic health of the country is dependent upon the condition of the nitrate export trade. When the nitrate *oficinas* (factories) are busy, Chile prospers; when their activity lags, Chile is depressed. The most serious financial crisis experienced by the country in the past generation followed the sudden drop in the exportation of nitrate in 1921. For many months, the government and the stronger producing companies had to care for 44,000 workmen and their families. Up to 1925, the value of nitrates exported had reached a total of 2½ billion dollars. The yearly output is upwards of 2 million tons, valued at 75 to 100 million dollars. The nitrate fields with their army of workmen form one of the chief markets for Chilean farm products. They give employment to some 40,000 workmen, employ hundreds of millions of dollars of Chilean and foreign capital, and provide the chief traffic for several railroads.

Ownership of Oficinas and Increase in Production.—Less than 125 of the *oficinas* are regarded as going concerns. Sixty of these, owned by Chilean capital, produce over half of the total output. There are about 40 British *oficinas*, several American,¹ and a few others. Not until 1894 did the output reach 1 million tons a year, produced by 51 *oficinas*. Fifteen years later 113 *oficinas* were producing 2 million tons a year; and during the

¹ In 1924, the Guggenheim Brothers acquired the Anglo-Chilean Nitrate and Railway Co., one of the leading nitrate properties in Chile. They are installing a new and much improved process and expect to produce about one-eighth of the entire nitrate output of Chile.

pressing demand created by the World War in 1917, the output of the 129 oficinas in operation passed 3 million tons. This was the high point and is not likely to be exceeded for some time to come. During that year, 57,000 workmen were employed. Soon after this, came the collapse of 1921 when only 1,310,000 tons were exported. Manifestly, it is an erratic industry, attended with heavy risks as well as with possibilities of large profits.

Mining and Refining.—Since the caliche lies very near the surface, it is nearly all mined by surface operations. Test holes are drilled at frequent intervals and samples are taken to determine where the caliche is sufficiently rich to justify mining. The depth of the barren surface material that must be removed, the number and richness of the nitrate-bearing layers below, the areal extent of the bed, and perhaps still other factors determine whether or not the deposit is workable at a profit. It is estimated that only 30 to 40 per cent of the land taken up for its nitrate proves to be profitable. In the mining operations, holes are drilled through the caliche, an explosive at the bottom of the hole is touched off, the overlying materials are broken into large pieces, many of which need further breaking to reduce them to practicable sizes for handling (Fig. 74). The barren and very low-grade pieces are sorted out, are piled apart from those that the workmen deem rich enough to go to the oficina, and are placed conveniently for loading upon cars or carts. It is a simple process, requiring little outlay for tools and making practically no use of machinery. The workmen work alone or in pairs and are paid in proportion to what they produce. The Chilean workman or *roto* prefers piece work to day work. He likes to feel that he is working for himself and that his pay is proportional to his own individual industry and skill. Under this system, he is an excellent worker. In all places where piece work or a bonus system can be used, the employer finds it to his interest and to the worker's liking to use it. Good workmen break up, sort, and pile about 3 or 3½ tons of caliche a day and earn the equivalent of about \$1 in United States money.

The nitrate field is traversed by many light, movable railways which lead in some cases directly to the oficinas, or to other lines which, in turn, lead to the oficinas. The oficina is centrally placed; here, the caliche is crushed and treated in tanks with hot water which dissolves a large part of the nitrate, but not all. The process in use is imperfect and the nitrate lost in this operation averages from 25 to 35 per cent.¹

¹ A new process perfected by the Guggenheims leaches the caliche at or near atmospheric temperatures and then crystallizes the nitrate by refrigeration. It is claimed for this process that 90 to 95 per cent of the nitrate is recovered.

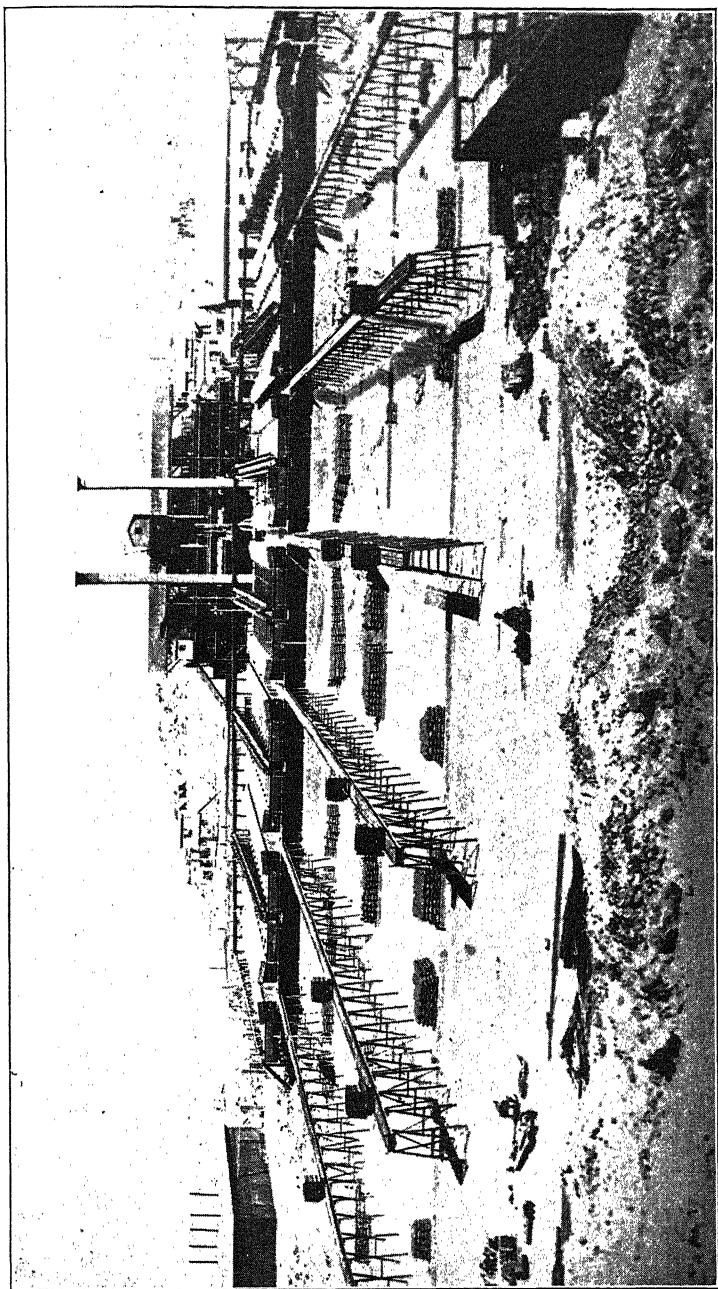


FIG. 75.—View of the nitrate oficina of W. R. Grace and Co. in the desert of northern Chile. (Courtesy W. R. Grace and Co.)

The hot solution is drawn off from the huge boiling tanks into vats where, as it cools, the common salt (NaCl) crystallizes first and is separated from the nitrate which later crystallizes out in fine white crystals. The nitrate is afterwards removed, dried, and stored in heaps in the open air (Fig. 75), for it does not rain there (or very, very rarely does).

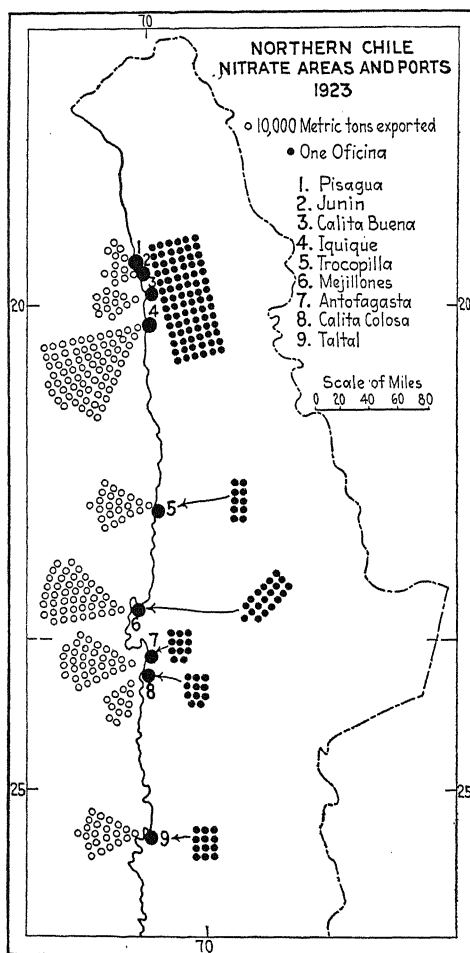


FIG. 76.—Nitrate ports and groups of nitrate oficinas which are tributary to them. The black dots show the number of oficinas, but not their exact locations.

Formerly, coal was used for fuel. Much of this was brought from Europe by the ships that carried away the nitrate. Now, petroleum is largely used, for it is cheaper and more convenient than coal. The petroleum comes largely from California and Mexico and a minor

quantity from Peru. Fuel in this region is expensive at the best and constitutes some 50 per cent of the treatment cost of nitrate. In 1925, there were 150 oficinas owned by 74 companies in the nitrate region, but many were idle and a number of the less profitable ones will not be reopened. The largest plants are capable of treating 2,500 tons of caliche daily, but the majority treat less than 500 tons. Still larger plants are in contemplation. Each of these larger properties, including the land, oficina, railways, workmen's homes, and other buildings, represent an investment of several million dollars. Each oficina is the center of a community, surrounded by absolute desert and dependent upon outside sources for water, food, fuel, and everything else that the community requires except the caliche.

THE NITRATE PORTS AND THEIR TRIBUTARY OFICINAS

Port	Number of oficinas tributary to port	Maximum capacity of oficinas, short tons
Pisagua.....	7	125,000
Junin.....	11	120,000
Caleta Buena.....	21	388,000
Iquique.....	46	1,291,300
Tocopilla.....	10	482,700
Mejillones.....	19	750,000
Antofagasta.....	11	540,000
Calita Coloso.....	11	293,800
Taltal.....	12	445,000
Total.....	148	4,435,800

Costs and Marketing.—Necessarily, there is a wide difference among the oficinas in cost of production, depending upon many variable factors, including efficiency of management. But, taken as a whole, the industry has been highly profitable to the majority of the companies. One of the strongest of these reported a net average profit of 40 per cent on its capitalization for a period of 21 years; this is much higher than the average. Nitrate prices have varied widely, but after the crisis of 1921, a Nitrate Producers Association was formed, and all of the producing oficinas (except the American) sell their product at fixed prices through the Association.

The cost of bags, of shipment to the coast, and of port costs amounts to between \$3 and \$4 a ton, and the ocean freight rate to the United States or Europe may be as low as \$5 a ton by chartered vessels or \$6 to \$7 in smaller lots carried by liners. The export tax imposed by the

Chilean government averages about \$10 a ton. The selling price maintained by the Nitrate Producers Association after 1922 was about \$50 a long ton. The annual sales vary widely. Under ordinary demands, they amount to 2 or 2¼ million metric tons. The United States has become the largest buyer of Chilean nitrate, a great deal of which is used by the cotton planters of the south. Europe, Egypt, and Japan buy most of the remainder. There are nine Chilean ports from which nitrate is regularly shipped (Fig. 76).¹

Reserves for the Future.—The existence of nitrate in the Atacama desert has been known since 1809, and production dates from about 1825. There is no reliable knowledge concerning the

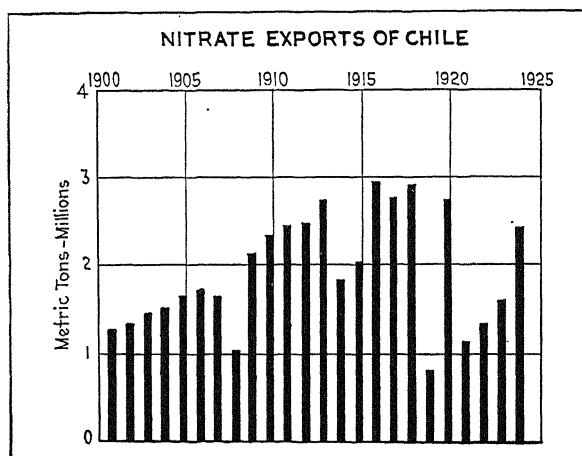


FIG. 77.—Exports in 1927 were 2,375,000 tons.

quantity of nitrate that still remains in the ground. Most of the unproved lands, but not all, belong to the Chilean government, and tracts are sold from time to time. There is abundant evidence that an enormous quantity of nitrate still remains, surely sufficient for centuries to come. The danger, as Chile sees it, is not the exhaustion of her nitrate but the possible successful competition of synthetic nitrates. Already, Germany is manufacturing nitrate fertilizer practically sufficient for her needs, and in the United States, there has been a demand that the government actively encourage the establishment of hydroelectric

¹ For detailed and authoritative account of the Chilean Nitrate Industry, see *Trade Information Bull.* 170, U. S. Dept. of Com., by H. FOSTER BAIN and H. S. MULLIKEN, January, 1924.

plants for the manufacture of nitrates, along lines that are being successfully followed in Norway.

The By-product, Iodine.—The caliche contains the valuable drug, iodine, obtained as a by-product of the nitrate-refining process. So great is the quantity of iodine that can be recovered that any one of the largest companies could supply the world's demands. Only a small fraction of the quantity that could be obtained is actually recovered, for it could not be sold. To prevent competitive sales among the companies and the consequent demoralization of prices, the iodine-producing capacity of each company is calculated and the company is assigned its quota; and when the year's sales have been determined, each nitrate company is paid its quota or percentage of the total income from iodine, no matter whose iodine was actually sold. The sales in 1916 reached the maximum of about 8 million dollars; but 3 million dollars a year is a fair average. The United States takes upwards of a half-million dollars' worth annually.

Salt and Borates.—Northern Chile is dotted with basins (*salares*) large and small which, in the past, have contained lakes. The floors of these old lake basins are sometimes composed of nearly pure salt, many feet in thickness. One of these (the *Salar Grande*) near the coast is connected to a port by an aerial tramway and supplies Chile with the greater part of its common salt. There are various other salt workings in the country, and the possible production is enormous.

Another type of *salar* contains borates from which borax is made. There are upwards of 25 of the borate *salares* in the desert of Chile and others in Bolivia and northern Argentina. All owe their existence to the accumulation of the salts in shallow basins by means of surface and ground water, the later evaporation of these waters, and the preservation of the salts by the arid climate. Chile is an important producer of borax and could produce a vastly greater quantity if it could be sold.

COPPER

Growth of Copper Production.—The Andes of Chile, like those farther north, were producers of copper before the Europeans came, and the Spaniards began production in a small way in 1601. But Spain took little interest in copper, partly because it was not then sufficiently in demand to awaken interest. In the latter

half of the nineteenth century, Chile was the leading copper producer of the world, and in 1876, yielded 38 per cent of the world's supply. Then the great developments in the United States placed its producers in complete control of the copper market. Chilean production fell off, and in 1906, it supplied only 4 per cent of the world's copper. In 1925, it had again risen to 15 per cent and Chile ranked next to the United States as a copper producer.

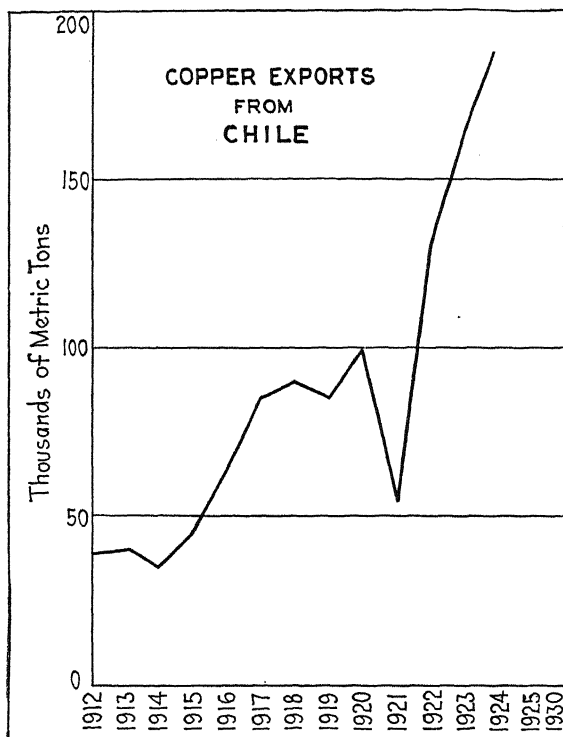


FIG. 78.—Chile ranks second among copper-producing countries. Nearly all of the copper comes from two mining camps.

As a rule, large copper deposits are found in rocks that are either themselves of igneous origin or in those that are closely associated with igneous rocks. The first great range of the Andes, after passing the low coast range on the west, is highly volcanic, as its many towering cones testify. Volcanic activity was vastly greater in the past than it has been recently, and during that more ancient period, the great deposits that are now being

worked were accumulated. The largest of the known deposits, while containing a vast wealth of copper, do not carry rich ores. Rather are they quite low in the percentage of copper which they contain, usually between 2 and 4 per cent. It is due to the great magnitude of the ore bodies and to the relative cheapness with which they are worked that two mining camps in the Andes have become leading producers among the world's copper mines. Yet, even these ore bodies had to await the discovery and perfecting of improved processes of mining and extraction and had to await a time when very large amounts of capital were available, before they could become profitable producers of copper. Chile's production in 1913, the last year before the World War, was only 40,000 tons. After this, the production rose rapidly, reaching 187,000 tons in 1924 (Fig. 78).

Control by Two United States Companies.—While there are dozens of copper-mining companies in Chile, more than 90 per cent of the copper is produced by two North American corporations. Most of the other producers are Chilean companies that operate on a small scale and with small capital. The North American copper mines in Chile are controlled by powerful and experienced copper-mining corporations. It is interesting to note that Americans dominate the copper, petroleum, and iron industries in South America, three lines in which they have become very proficient at home, but that they have done much less in tin mining or nitrate production, two activities in which they have had no opportunity to gain experience in the United States, for neither of these minerals is found in quantity there.

Mine of the Chile Copper Company at Chuquicamata.—This is the leading copper-producing property of South America (Fig. 79). It was acquired and developed by the Guggenheim Brothers, who later sold a controlling interest to the Anaconda Copper Company. The property is valued at upwards of 100 million dollars. It is located in the desert of northern Chile about 100 miles inland and 165 miles northeast of the ports of Antofagasta and Mejillones to which it is connected by the main line of the Bolivia and Antofagasta Railroad. The ore body itself is one of the many mountains of this region, and is mined, or rather quarried, by blasting and steam-shovel work. No underground workings exist, but the face of the mountain is blasted off at various levels, and the ore is moved to the crushers nearby in train loads at the rate of over 20,000 tons a day.

As already indicated, the ore is of low copper content (a little over 2 per cent), but the operations are conducted on such a vast scale and so cheaply that the refined copper is produced at about the lowest cost ever attained (7 or 8 cents a pound). The crushed ore is leached with sulphuric acid, which is itself made as one of the by-products of the process. Later, the copper-bearing solution is treated electrolytically and the copper is deposited in sheets on massive copper-silicon anode plates from which it is stripped, melted, refined, and cast into bars or ingots of practically pure copper. The powerful electric current (60,000 horsepower) that is required for this process and for driving the machinery is generated with fuel oil at a point on the sea coast

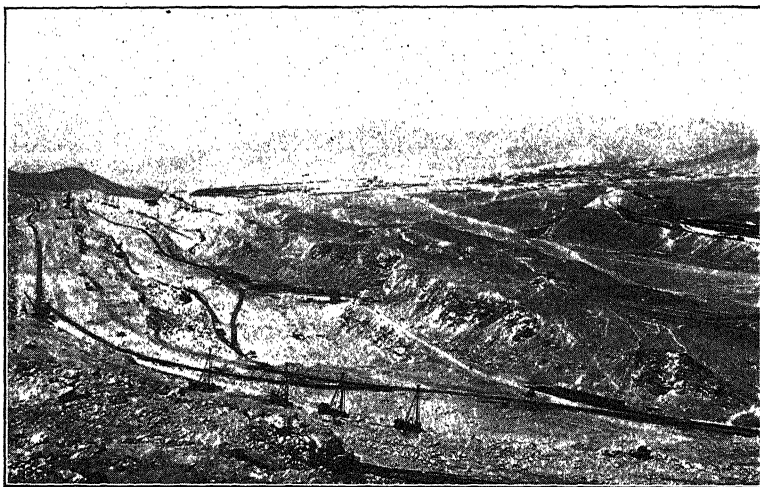


FIG. 79.—View of the mine workings of the Chile Copper Company at Chuquicamata. Over 20,000 tons of copper ore are handled daily. It is the greatest copper camp in the world. The region is an absolute desert. (*Courtesy Chile Copper Co.*)

(Tocopilla) 100 miles away and is transmitted by wires to the mines. It is cheaper thus to transmit the electric current than to transport the oil or coal to the mines. This is another of the economies which the company has been able to effect. The copper still remaining in this ore body is the largest reserve known and is conservatively estimated at 134 billion pounds, for copper is sold by the pound, not by the ton. The output can be raised as rapidly as the market conditions will justify it.

The Equipment of the Mining Camp.—Another factor enters into a great enterprise like that at Chuquicamata, namely, providing for the comfort and contentment of the large army of laborers and other employees. If men are to be attracted to the desert and held there in a

reasonable degree of contentment, life in the camp must be made endurable and even enjoyable. This is especially true when there is a shortage of labor as there is in Chile, with the nearby competition of the nitrate fields. There are 13,000 to 15,000 people at Chuquicamata, of whom 700 to 800 are engineers, chemists, metallurgists, machinists, etc., and their families. These employees are mainly from the United States and are employed on contract at good salaries. Most of the other workers are Chileans of the *roto* class, strong, energetic, and efficient, if working on a piece system or bonus system. They are paid about 10 pesos¹ a day and are provided with living quarters, medical service, and opportunities for pleasure and recreation. They live in two- or three-room houses, systematically arranged on improved streets, well sewered and provided with water and electricity. Their living



FIG. 80.—Copper ingots in the storage yards of the Chile Copper Company at Chuquicamata in northern Chile. (*Courtesy Chile Copper Co.*)

conditions are decidedly superior to those of the working class, generally, in Chile or other South American countries.

The salaried employees have neat homes, tennis courts, baseball and football fields, moving pictures, and a \$100,000 club house that is more attractive and better equipped than one finds in many good-sized American cities. Two kinds of water—one for drinking purposes and the other for industrial uses—are piped in from the mountains 80 miles back. One of the very best hospitals on the whole west coast is maintained. There are schools, a guest house, hotels, stores maintained by the company and also by outsiders, and an efficient police and sanitary staff. It is probably the model mining camp of the world.

¹ About \$1 United States money in 1924.

An Example of Important Principles in Economic Geography.—

As an example of a modern mining camp of the most advanced type, Chuquicamata deserves more than passing notice, for it illustrates impressively certain principles with which our study is concerned.

The existence of the ore body was known long ago, and efforts to mine it profitably had been made but had failed. Of the many factors which had to be taken into account in mining, refining, and marketing the copper, all but one were unfavorable. The favorable factor is the abundance of the ore lying at the surface of the ground. Opposed to this are many unfavorable elements, namely, (1) the low percentage of copper in the ore, (2) the remoteness of the region from the great centers of copper consumption in Europe and the United States, (3) the absolute desert which surrounds the ore body, and the complete absence of

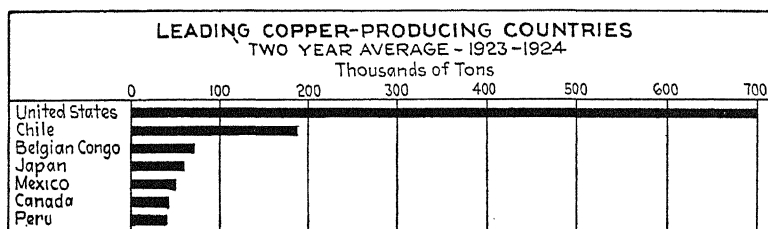


FIG. 81.

everything necessary to the operation of the mine. There is no drinking water, or water for the industrial operations; no fuel of any kind within many hundreds of miles; no timber, no food or any chance to raise it—in short, an unqualified desert within the tropics in a very out-of-the-way part of the world.

A generation ago, there began a series of events which gradually changed the whole aspect of the problem and brought about the present highly successful and profitable development of this remarkable ore body: (1) The Antofagasta and Bolivia Railroad was built, and passed within a few miles of the mine. (2) During this same period, the long-distance transmission of high-voltage electric currents was perfected. (3) Methods of leaching ores and separating the copper on a large scale by an electric current were developed. (4) The world's consumption of copper had risen rapidly. (5) Certain copper-mining companies in the United States had acquired a wealth of experience and had amassed large capital. One of the most wealthy of these com-

panies believed the time was at hand when the low-grade ores at Chuquicamata could be mined and marketed at a profit. (6) In 1914, the Panama Canal was opened, giving a direct route to the eastern United States and Europe. By this series of changes, the *time* became propitious for investing a huge sum of money in this great enterprise. The only people who had had long and successful experience in mining copper on a large scale under somewhat similar conditions were the mining men of the western United States, and a group of these acquired the ores at Chuquicamata. Thus was the second essential provided, namely, the *people* capable of carrying the enterprise forward with probability of success.

The geographical factor in this triangle of *place*, *period*, and *people* is that of *place*. The existence in this particular region of an ore body is a geographical and geological matter, but the surmounting of the difficulties by which the ore is mined and delivered to the world's industries is a matter of human initiative and human achievement; but it was an enterprise which had to await a time when it could be successfully undertaken, as it could not have been at an earlier date. The right *place*, the right *period*, and the right *people* had to come into conjunction.

OTHER MINERALS

Iron Resources and Production.—Chile has two known iron-ore bodies of large size, containing in the neighborhood of 1 billion tons of high-grade ore. One of these is in Atacama, near the port of Huasco, but it is not an active producer. The other is a little back from the coast near Coquimbo on the Bay of Cruz Grande, and is actively worked by a subsidiary of one of the largest steel corporations of the United States, the Bethlehem Steel Corporation. Modern shipping docks similar to those at the head of Lake Superior have been erected. An electric railway leads down from the mines to the docks, and the loaded cars, coming down, generate power which hauls the empty cars back. Specially designed steamships of large capacity receive the ore and carry it by way of the Panama Canal to the company's smelters on the ocean front near Baltimore or to other eastern smelters. By means of these highly efficient methods, Chilean iron ore is marketed in the United States, which is itself the largest producer of iron ore in the world. In 1924, the shipment of ore from this port had reached

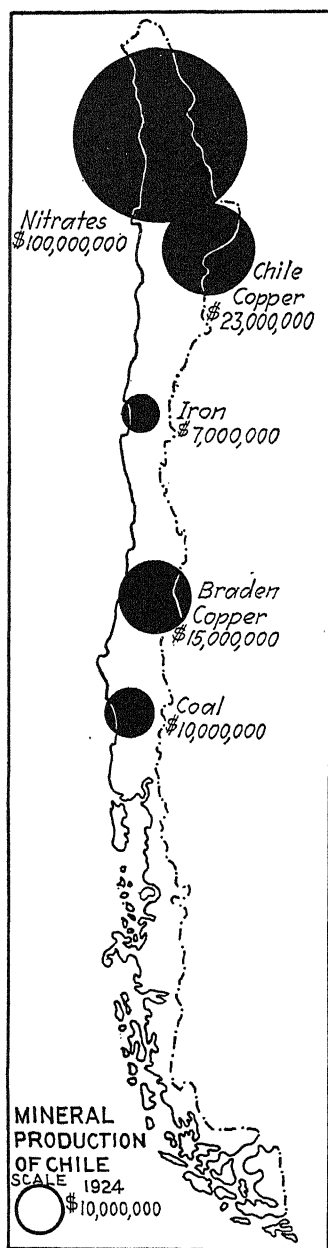


FIG. 82 .—Approximate location and output of the chief mineral regions of Chile.

1,500,000 tons. If a method of coking Chilean coal shall be found, or, lacking this, if coke can be brought back cheaply in the ore boats from the United States, there appears to be no reason why, at some time in the future, Chile should not develop an iron and steel industry of its own. This will be an important step toward that economic independence which nations greatly desire.

Miscellaneous Minerals.—At times in the past, Chile has been a large producer of the precious metals, especially of silver, but its present output is small. In recent years, Chile has supplied from 4 to 10 per cent of the world's silver, all mined in the northern third of the country. The gold output is valued at from a half-million to a million dollars a year, mainly derived from the working of copper and silver ores. Sulphur, manganese, lead, and zinc are obtained in varying but small quantities.

The Great Importance of Minerals in the Economic Life of Chile.—Because of her mountains, her deserts, and her limited

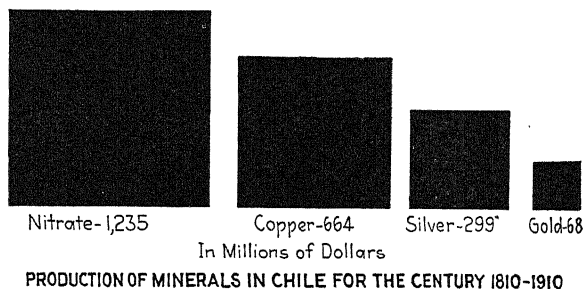


FIG. 83.

area, Chile cannot be a great agricultural nation like her neighbor Argentina. Much more food can be produced in Chile than is now produced, and a population several times as large as the present can be fed from the land. But it is to their mineral resources that the Chilean people look for the upbuilding of the future nation. At present, 90 per cent of the value of all exports from Chile are nitrate and copper, and the reserves of both are enormous. Iron is abundant and coal is available, and upon these two, the manufacturing of the future may be built. No other South American country except Brazil has such well-balanced resources as Chile, and among these, her mineral wealth is most significant.

(For references see end of Chap. VIII.)

CHAPTER VIII

CHILE: THE CENTRAL VALLEY AND THE SOUTH

THE CENTRAL VALLEY

Physical Features.—This valley is 600 miles in length and has an average width of 25 or 30 miles. It is a great trough

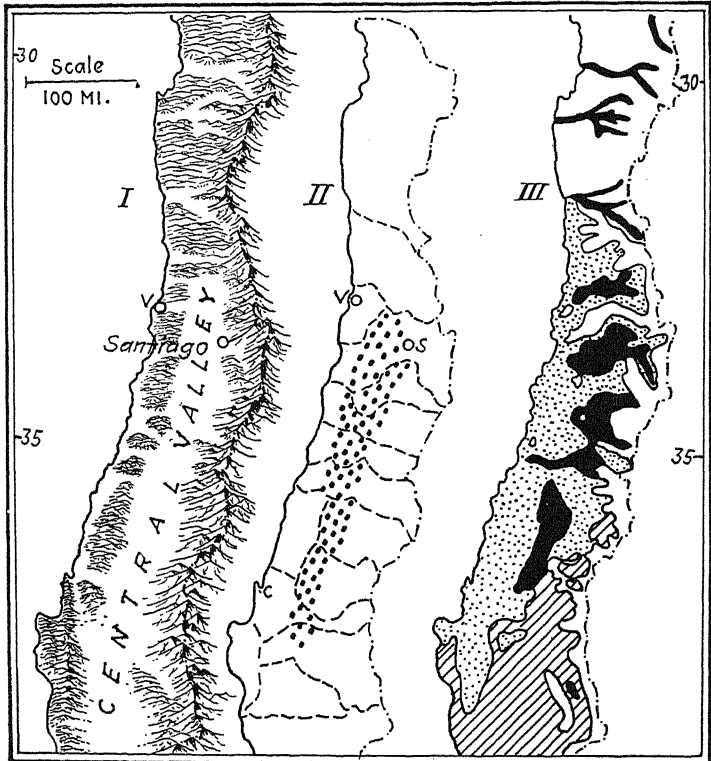


FIG. 84.—I, topography of Central Chile. II, irrigation. Each dot = 25,000 acres. (After D. S. Bullock.) III, irrigated and unirrigated farmlands. Black, irrigated land; stippled, unirrigated farmland; cross-lined, forests. (After Mark Jefferson.)

partly filled with the gravels, sands, and clays that ages of erosion have carved from the mountains (mainly on the east)

and have deposited in the trough between. Large parts are nearly as level as the sea, but with a prevailing slope toward the west. Other parts are rolling or hilly. Many rivers rise in the eastern cordillera, flow across the valley floor, and cut through the coast range to the sea. This valley is the heart of the Chilean nation.

The Importance of Irrigation.—It has already been pointed out that, because of the location of middle Chile in the region of the horse latitudes, it has a Mediterranean type of climate with the dry summers and rainy winters which belong to that type of climate. The winters are mild throughout the valley; yet they are too cool to permit the raising of general crops during the winter months of ample rainfall. Since warmth and water at the same time are necessary to the growth of crops, it follows that the Chilean farmer in the northern part of the valley must find a way to supply his land with water during the warm but dry months of summer. A partial solution of this problem lies in diverting water from the streams that flow across the valley. The Indians did this anciently; the Spanish did it in the colonial days, and the Chileans have still further extended the irrigation works. The greater part of the land that is actually cultivated in the northern 200 miles of the Central Valley has to be irrigated.

Government officials exercise the necessary supervision over the use of irrigation water; yet most of the irrigation works have been built gradually in the past by the land owners themselves. As a rule, these works are simple and relatively inexpensive. There are few large dams and reservoirs such as those in the western United States. For the most part, the irrigation works consist of canals which tap the rivers at convenient points and lead the water along the higher lands of the estates or farms, whence it is distributed by branch canals and ditches to as much land as can be watered. Few great engineering feats have been attempted, and there are only two government irrigation projects of large size. Yet these irrigation works are effective, because the streams from the mountains are perennial. Under the present system, the country produces most of the foodstuffs that its people require and a small surplus of some products. Only a minor fraction (5 per cent) of the total land in the central provinces is actually reached by the ditches, and the total of irrigated land in all Chile is placed at 2,800,000 acres, or 4,375 square miles. California has 4,250,000 acres under irrigation.

Yet so valuable is this irrigated land of Chile, lying near the chief cities of the republic, and so productive is it that its importance in the agricultural life of Chile is much greater than its small area might suggest.

The official estimates state that 1,800,000 additional acres are capable of irrigation, but at an increasing unit cost; for, naturally, the lands most easily irrigated have been the first to be supplied with water.¹

Large Land Holdings.—Most of the desirable land in the Central Valley has passed in very large holdings into the possession of families that became the landed aristocracy of Chile. Over 500 great estates still exist and these include more than half of the agricultural land of the country. It is an impressive fact that one-half of 1 per cent of the people own 59 per cent of the farm land. Farms of 500 acres or larger make up over 90 per cent of the total land included in farms. This necessarily means that agriculture as an industry is conducted on an extensive rather than an intensive scale. Owners of the large estates are away from their estates a great deal and usually live in the larger cities. City life is more attractive than the isolated country life on the estates. A farm manager is employed and is given a rather free hand. The owner is concerned mainly with the net return which he may depend upon and prefers to avoid annoyances and disagreeable details. He desires to retain the estate in the family, but he is not fond of giving his personal attention to the farming operations. Under such a system, farming goes on as it always has; progress is slow and production per acre is low.

But this is not the whole story of farming in Chile, for the country has a homestead law that has placed many farmers on small pieces of land. From time to time, large estates are divided among the heirs, and parts of these are sold to small holders. By one means or another, some 76,000 farm holdings of less than 125 acres have come into existence, and most of these are operated by their owners.

Chile thus has two distinct types of land holder, but the fact remains that 90 per cent of the farm land is in holdings of over 500 acres. The holders of the big estates form a powerful group in the politics of the nation. Naturally, they are conservatives;

¹ For a condensed account of irrigation in Chile, see *Geog. Rev.*, vol. 6, p. 370, October, 1918.

naturally, they oppose any considerable taxation of farm land; naturally, they do not look with favor upon expensive public improvements, such as modern roads, the cost of which must fall heavily on the land holders. They are interested in keeping the cost of agricultural labor low and generally view with skepticism very much education for the children of their laborers.

Farm Labor.—In southern Chile, farm laborers receive from $1\frac{1}{2}$ to 4 paper pesos a day. In 1925, this represented from 16 to 45 cents. In middle and northern Chile, wages are somewhat higher. Those receiving the lowest wages also get a hut to live in and a little piece of ground to till. They usually labor from sunrise to sunset and are willing and industrious workers. The two-wheeled farm cart, the one-handled plow, and the patient, plodding oxen form a characteristic sight on Chilean farms. Horses are used relatively little. Where wages are so low, time does not greatly count, and oxen are economical. On the great estates, *inquilinos* are the usual farm laborers. They are half-breed or Indian peons who are closely attached to the estate, cannot leave it if they have any debts due to the owner, and quite commonly spend their lives on the estate, as their fathers and grandfathers have done. The living conditions of most of these laborers' families are pitifully primitive, even more so than those of the negro of the Southern United States. Yet it is by no means sure that those who leave farm labor and go to work in the mines and nitrate fields better their condition, all things considered, although they receive larger pay and may have better living conditions. The number of laborers on the farms exceeds the total of those engaged in mining and manufacturing combined.

FARM CROPS

Wheat the Chief Cereal.—For a number of reasons, wheat is the principal crop of Chile: (1) the Chileans prefer wheat bread to any other kind, and this provides a home market for most of the grain; (2) there is always a foreign market at reasonable prices for any surplus that may be exported; (3) the climatic conditions are especially well suited to wheat growing.

It will be recalled that the Valley of Chile has a rainy season and a dry season. Wheat is a grain that calls for plenty of moisture during the early stages of its growth but ripens best in a dry period. It thrives on a relatively low rainfall, as it does in

the Great Plains of the United States and Canada and in Australia. These habits of the wheat fit it ideally to the climate of the Central Valley where practically all of the Chilean crop is raised both with and without irrigation. In the latter case, it is customary to plow part of the land in spring, allow it to lie fallow during the dry summer, cross-plow or harrow it in the fall, and sow the seed with the coming of the early rains which occur in May and June. So mild are the winter months that the wheat grows during the winter and spring, and matures in the dry sunny summer and early fall. In other cases, the seed is sown in the early spring, grows with or without artificial irrigation during the summer, and is harvested in the autumn. Wheat is the principal crop throughout the valley, but it is especially important in the provinces of Malleco and Bio Bio, in the general region

ACREAGE OF CHIEF CROPS OF CHILE—FOUR YEAR AVERAGE 1920-23

Wheat—1,250,000 Acres	Vines 167,000 Acres	Barley 130,000 Acres	Beans 110,000 Acres	Potatoes—80,000 Acres	Orts—15,000 Acres	Corn—68,000 Acres	All Others 120,000 Acres
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FIG. 85.—More land in Chile is devoted to wheat than to all other crops combined.

of the Bio Bio River near whose mouth is the important city of Concepcion. The acreage devoted to wheat is rather uniform from year to year. The average is about 1,250,000 acres giving a yield of 22 million bushels, or 18 bushels to the acre, somewhat above the average yield in the United States (Fig. 85). The average exports amount to 8 to 10 per cent of the crop, but the exportation of wheat and flour will not continue far into the future, for the increasing home demand will soon overtake the supply.

To a considerable extent, wheat is still threshed by driving horses round and round in a circle on a threshing floor until the grain is tramped out. On the larger farms, modern threshing machines are used. The wheat is shipped in sacks, and in the late fall, the warehouses along the railroads and all available cars are piled high with sacks of wheat. It is the only cereal grown in Chile in a large way. It occupies four times as much land as is devoted to all other cereals combined, and supplies two-thirds of the cereal products of the country. The

wheat crop of Chile is about one-eighth that of Kansas in a good year, and the country ranks about sixteenth among the wheat growing countries of the world.

Cereals Other Than Wheat.—Oats and barley are of minor importance in Chile, and corn (maize) forms only 5 per cent of the total production of cereals. Rye production is insignificant. The German population in the southern portion of the valley and the breweries which they have built are responsible for a part of the production of barley, which is used in making malt. The small production of corn and the small number of swine raised in Chile doubtless have some causal connection.

Vegetables: The Legumes.—Throughout Latin America, beans of various kinds form an important item in the diet, especially in that of the poorer people. The same is true to a lesser degree of peas. These two vegetables supply the nitrogenous element in the food, the element which is provided by meat in the diet of people who can afford or who prefer this more expensive food. All legumes raised in Chile occupy only 12 per cent as much land as wheat alone.

Potatoes are not a large crop and the average yield is only about 10 million bushels or $2\frac{1}{2}$ bushels per capita of the Chilean population. This compares with 4 bushels in the United States and 20 bushels in Germany. The potato belt of Chile is at the southern end of the valley and on the large island of Chiloe where the cooler temperature and fairly well distributed rainfall are favorable to this crop.

Truck and garden crops of practically every variety known in temperate and semi-tropical climates grow in Chile. Melons are of many kinds and of delicious flavors. The mild climate of the valley permits hardy vegetables to grow throughout the winter, and it is not uncommon to obtain four crops a year from the irrigated land.

Tobacco is a crop of only minor importance.

Alfalfa is a crop on the irrigated land, though far less important than it is in Argentina. It is grown mainly in four provinces near Santiago. Clover and grasses are extensively grown, and baled hay, clover, and alfalfa are sent to the mining camps and nitrate fields for feeding the horses and mules.

Fruit Growing.—The Valley of Chile was designed by nature for the production of fruit, and almost every known variety grows there. It is the California of South America, for the Valley of

Chile grows nearly the same fruits with the same profusion. There are no extremes of heat or cold; sunshine is abundant, and irrigation water is applied as it is needed. Among the subtropical fruits are oranges, lemons, olives, and figs; all of these fruit crops are typical of Mediterranean climates. No such development of general fruit growing, however, has taken place in Chile as in California, partly because the Chilean fruit grower has not a market for any large quantity of these fruits. He is not part of a nation of 110 million people, as the California fruit grower is; and even the latter finds his major problems in transporting and marketing his crop rather than in growing it. Apples, pears, peaches, plums, apricots, cherries, and all kinds of berries are raised. Strawberries are grown throughout the summer and late into the fall. They are cheap and delicious. Apples and peaches are inferior to those grown in the western United States, due to the more backward state of this industry in Chile as compared with California and Washington. Next to grapes, apples are the fruit to which the most attention is given, and an effort is being made to establish some 10 or 12 of the best North American varieties in Chile. Shipments of Chilean fruits to the United States by way of the Panama Canal have been sufficiently profitable to encourage the belief that an "off-season" fruit trade with the United States can be maintained. Among the nuts grown on a commercial scale are almonds and walnuts; the latter have become an important item of export. For a country situated far from the great consuming centers, nuts as an export crop are superior to the perishable fruits.

Grapes and Wine.—The high development of vineyards and of wine making in Chile is a response to two main causes: (1) the ideal climate and (2) the wine-using habits of Latin Americans. Moreover, wine is a concentrated and valuable commodity, and does not require marketing at a particular time as fruit does.

More than twice as much land in Chile is devoted to grapes as to all other fruits combined, and about one-third of the annual crop of 15 million pounds is grown under irrigation. Two-thirds of the vineyards are in the northern section of the valley between the Bio Bio River and Santiago. About every known variety of grape grows excellently, and the size of the individual grapes and of the clusters is astonishing. Clusters weighing several pounds each are common. In the city markets and at the railway stations, this delicious fruit is offered for sale at prices as low as

2 or 3 cents a pound. Upwards of $1\frac{1}{2}$ million pounds of raisins are made, but the industry is not yet a large one; it easily might become such, for climatic conditions are favorable. The greater part of the grapes are made into wine, and Chilean wines have

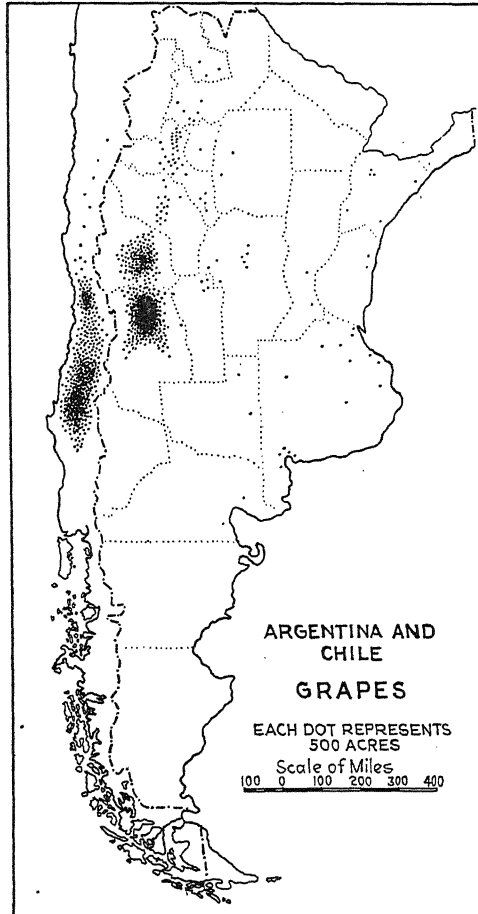


FIG. 86.

attained real excellence. In the region surrounding Santiago and immediately south are situated the principal wine-making establishments, some of which are very large and involve the investment of millions of dollars capital in land, plant, and equipment. The fact that the better wines are stored for years before they are

marketed adds greatly to the amount of capital required for conducting the industry. Most of the wine is consumed in Chile.

Drying and Preserving Fruit.—As in California, so in Chile, the drying and preserving of fruit is becoming an industry of importance, and fruits thus preserved are exported to the extent of about a million dollars annually in addition to supplying practically the entire home demand.

MINERALS OF CENTRAL CHILE

Coal Production.—It has already been pointed out that South America is extremely poor in coal, in fact, the poorest of the continents. Of all the South American countries, Chile alone produces coal on a commercial scale, but on a small scale. The only mines of importance are situated on the coast not far from the city of Concepcion, in the southern half of the country (Fig. 82). The best veins are those worked at Lota and Coronel. About 12 or 14 mines are operated, and the annual output is a little more than a million tons a year. In quality, the coal is a low-grade bituminous, not suited to coking by present methods. Four companies mine about three-fourths of the total output. It is done by inefficient methods and the cost is high, so high that the use of the coal is restricted, and fuel oil is coming more and more into use in mining and nitrate operations. Only the state railways are large buyers of the native coal. However, the fact that Chile has coal well situated for mining is a matter of national importance and may play a significant part in the future industrial development of the country. One of the foremost needs of a modern nation is the need of sources of mechanical energy, either coal, oil, or water power. Chile has the coal and potential water power and they are two of her great assets. Chile is both an importer and an exporter of coal, and the two movements nearly balance, although the increasing use of fuel oil is cutting down the importation of British coal, which formerly came in return cargoes in the ships that carried away the nitrate. It is an interesting fact that when coal is shipped to the interior, it is usually shipped in sacks to save it from pilferage, and even then, some 7 or 8 per cent of it disappears in transit. Ordinarily, imported British coal costs no more at the nitrate ports than does Chilean coal, and the former is superior.

The Mines of the Braden Copper Company.—About 60 miles south of Santiago, at El Teniente, is one of the two great copper

camps of Chile (Fig. 82). The mines are at an elevation of over 8,000 feet in the mountains back of Rancagua, a station on the Central Railway of Chile connected with El Teniente by the company's railroad. Nearly 50 million dollars of United States capital has been invested in land, mines, hydroelectric plants, aerial tramway, mill, smelter, machine shops, dwellings for employees, hospital, schools, clubs, railway, locomotives, cars, and miscellaneous equipment. Snow storms are heavy and many miles of snow sheds are needed to protect the railway. The mining operations are underground; the ore is low grade, averaging only a little over 2 per cent copper, but the proved ore body has over 250 million tons, enough for 50 years to come. So efficient are the operating methods that copper is produced at 7 to 9 cents a pound. This mine and that of the Chile Copper Company at Chuquicamata are among the leaders of the world in cheapness of production.

THE LIVE-STOCK INDUSTRY

Horses and Oxen.—In its use of horses, Chile differs widely from its neighbor, Argentina, on the opposite side of the Andes, for Chile is in no sense a land of horses. Rather may it be called a land of oxen. In the entire country, there are less than 400,000 horses, or 1 to each 10 of the human population of the country, as contrasted with 1 to 1 in Argentina. Saddle horses are commonly used both for riding over the extensive estates and for traveling over the country roads, many of which are poorly suited to wheeled vehicles, but horses are much less used than oxen as draft animals. Oxen are less expensive than horses, are more cheaply kept, require an inexpensive yoke instead of an expensive harness, and at the end, may be used for meat.

Goats are not raised on a large scale anywhere in Chile; yet there are more of them than of horses in the country. They are raised mainly in the dry lands north of Santiago and Valparaiso.

Swine are even less numerous than goats, there being only about 300,000 in all Chile. Single counties in Iowa have that number.

Cattle are raised practically everywhere in the farming section, but no part of the country specializes in cattle. In fact, not enough are raised to supply the beef required by the country, and large numbers are driven over the mountains from Argentina

for slaughter in the mining camps and nitrate fields. There are regular routes followed by the cattle drivers, and the industry is of considerable importance.

Dairying is unimportant, and such butter and cheese as are made are practically all made on the farms under none too sanitary conditions. In the southern half of the Central Valley and in many of the smaller valleys in the mountains, dairying could thrive and eventually will do so. At present, Chile imports butter and cheese, mainly from Argentina.

Sheep are raised in many parts of Chile, but more than three-quarters of the wool grown in Chile comes from the extreme south.

THE SOUTHERN GRAZING AND FOREST REGION

The southern half of the Valley of Chile is submerged beneath the sea. From Puerto Montt southward, the hills which form the southern continuation of the coast range become a chain of islands. The sinking of this coast has depressed the valleys below sea level, and they have become arms of the ocean. Many glaciers still occupy the high valleys of the Andes in the far south. Larger glaciers once occupied these valleys and eroded them deeply. A part of the depressions thus eroded are now occupied by beautiful lakes, similar to the glacial lakes of Switzerland. The overdeepened lower valleys on the coast have become fiords, similar to those of Alaska. The heavy rains which the westerly winds from the Pacific precipitate upon the mountain slopes cause the growth of dense forests which completely clothe the Pacific side of the Andes in this region. So heavy is the rainfall and snowfall that the ground is saturated with water. The winters are wet and disagreeable, and very few people live in this part of Chile. Still farther south, practically at the end of the continent, are grass lands which constitute the principal sheep pastures of Chile.

The southern forest belt of Chile occupies a third of the length of the country, forms a seventh of its total area, and contains nearly four-fifths of its saw timber.

The Forest Industries.—Southward from the latitude of 38 degrees, Chile was a heavily forested land when the white man came. In the northern end of this forest belt, the fierce Araucanians made their last stand. The forests have now been nearly cleared from the southern end of the valley, and productive farm

lands have taken their place. South of Puerto Montt, where the railway ends and the island-fiord region begins, the country is clothed in a forest of hardwoods and conifers. So wet and spongy is the ground that the few roads are usually sloughs of mud, and six or eight oxen may be needed to haul a log to the mill. Rains are so frequent and so heavy that lumbering operations are carried on under difficulties, and are confined mainly to the three least rainy months. In this mountainous region, the proportion of large, straight trees suitable for saw timber is small. Of some 39 million acres of original woodland, only one-eighth contains commercially valuable saw timber. The remaining seven-eighths is suitable for posts, poles, firewood, and second-rate lumber, or consists of land that has been cleared or burned over. So long as tariff duties on lumber were moderate, Chile imported the major part from the west coast of the United States, but a recent great increase in the tariff duties has led to a larger use of the native woods.

In spite of the climatic and topographic difficulties under which lumbering is carried on, the forest and wood-working industries rank third (after mining and agriculture) among Chilean industries. Between 600 and 700 small sawmills are in intermittent operation, and forest products form a leading item of traffic on the railway in the southern half of the valley. The forests of Chile are a national asset in that they can, if necessary, supply the wood, lumber, and timber which the country requires, and thus they contribute to the self-sufficiency of the nation. But there is no comparison between the forests of Chile and those of the coast of Oregon and Washington.

Sheep Raising.—Sheep raising as an industry is of two distinct kinds in Chile. The sheep are raised in moderate numbers throughout the farming sections, and their wool constitutes a product of the general farming operations. But in the far south, in the Territory of Magellanes, sheep raising has become a specialized industry of dominating importance, as it has on the Argentine lands across the border. The Andes are progressively lower as one proceeds toward the south and disappear under the sea at Tierra del Fuego. Here, in the latitude of about 50 degrees, the climate is sufficiently cold to give the sheep thick, heavy fleeces. Pasture land is inexpensive, and some of the largest sheep ranches in the world are found. As a rule, the sheep-raising companies are corporations that conduct their

ranches as capitalistic enterprises. In the Chilean part of this region, there are some 50 large ranches, partly controlled by Chilean capital and partly by British capital, but commonly in charge of Scotch managing shepherds. The majority of the large ranches carry from 20,000 to 50,000 sheep, but one company has 1,300,000 which is more than one-fourth of the total number in all Chile. This company is capitalized at 8 million dollars, and its shares of stock are quoted at four or five times their par value, an evidence of the large profits that are being realized (not infrequently 30 to 60 per cent a year).

Most of the sheep are cross-breeds, raised both for wool and for mutton. Due to the cold climate and to the selected breeds, fleeces of 8 or 10 pounds of wool are secured—a very high average. Of some 25 million pounds of wool annually shipped from Chile, nearly 80 per cent goes from Magellanes Territory, and most of it goes to England, whose ships run regularly to this region, especially to the port of Punta Arenas where both Chilean and Argentine wool is assembled for oversea shipment.

In addition to wool, large quantities of chilled or frozen mutton are also shipped from a half-dozen freezing plants that have been erected in the Punta Arenas region. An interesting by-product of the sheep-slaughtering industry is the preparation of sausage casings from the intestines of the sheep; $1\frac{1}{2}$ million of these are sent annually to the United States. Sheep products, including wool, frozen mutton, sheep skins, and sausage casings, constitute the third largest export of Chile, being exceeded by only nitrate and copper.

TRANSPORTATION

Railways.—The railroad pattern of Chile is governed by the peculiar shape of the country. While the railway system of Argentina is essentially a great fan with its handle at Buenos Aires, that of Chile may be compared to a herring bone (Fig. 125). A central line extends from north to south throughout the greater part of the length of the country, and many short lines branch off to the sea ports or to places in the foothills of the cordillera. The extreme northern link is not yet completed, but there is continuous rail connection north and south for upwards of 1,500 miles. In all, the country has around 6,000 miles of railway, over half of which is owned by the government. Nearly all of the privately owned lines belong to British companies. These are mainly in

the northern part of the country, particularly in the nitrate region. The oldest existing railway in South America is in Chile.¹ Unfortunately for the efficiency of the railway system, six different gages are in use, ranging from 2½ feet for the Antofagasta and Bolivia Railroad to 5½ feet for the state-owned Central Railroad. The longitudinal lines north from Cabilda are of meter gage and are built for strategic reasons rather than with any expectation of profit for a long time to come. Taken as a whole, the state-owned lines are operated at a loss, but the privately owned lines return a profit.

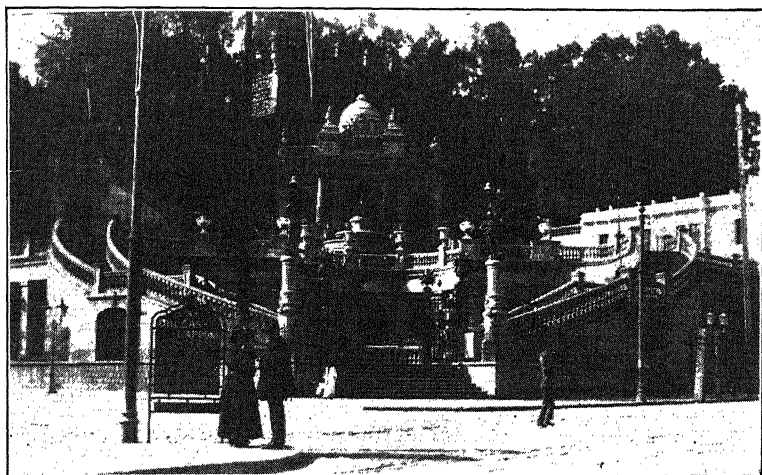


FIG. 87.—Entrance to the beautiful park of the Cerro Santa Lucia in Santiago, Chile.

The transcontinental line, extending from Valparaiso on the Pacific to Buenos Aires on the Atlantic, 886 miles, is one of the famous railways of the world. The narrow-gage mountain section employs a rack-rail system for a 20-mile stretch where the grade reaches 8 per cent. It passes the summit level by a tunnel at an elevation of over 10,000 feet. The cost of this mountain railway was staggering, and its present capitalization is at the rate of \$317,000 a mile. The road carries little freight, and the

¹ The line from the port of Caldera to the mining center of Copiapo was built in 1849 by an American, William Wheelright. He also founded the Pacific Steam Navigation Company, one of the principal steamship lines serving the Pacific ports of South America. Wheelright was also builder of the first railway in Argentina.

passenger fares are extremely high. Financially, the line is a failure. The scenery is truly grand, but less grand than that along the Central Railroad of Peru. The Transandine Railway has serious trouble with heavy snows and snow slides, and miles of snow sheds are required. At the summit of the pass, on the Chile-Argentine boundary, stands the statue of the Christ of the Andes, erected by the two countries as a pledge of enduring peace (Fig. 126). On the principal railway lines of Chile, modern sleeping, dining, and parlor cars are operated. The Central line from Valparaiso to Santiago is electrified, and further electrification is under way. Next to Argentina, Uruguay and the coffee district of Brazil, the railway facilities of Chile are the best in South America.

Highways.—In the northern half of Chile, the desert and its sparse population preclude the building of good roads, and only an occasional short stretch near some city exists. In the rain-soaked forest region of the south, good roads are next to impossible. Even in the rich and populous Central Valley, the roads are little more than broad trails, deep in dust in the dry season and deep in mud in the rainy season, as they were in the United States not long ago. Very little hard surfacing has anywhere been done. Ox carts are the chief means of hauling products to markets or to railway stations. In country roads as in farming methods, Chile is in a backward condition.

THE MANUFACTURES AND COMMERCE OF CHILE

The Growth of Manufacturing.—Like other South American countries, Chile has not yet reached the industrial stage. Manufacturing must develop slowly in a country of small population and small capital. Chile is still primarily an exporter of the products of the land, including the minerals, and an importer of manufactured goods. But Chile is seeking to be as little dependent as possible upon imported goods. By 1914, there were slightly over 6,000 establishments engaged in some form of manufacturing. Most of these were workshops rather than factories, for the average number of persons employed was only eight to the establishment. The smallness of the manufacturing industry may be seen from two comparisons: (1) The total number of persons employed in all forms of manufacturing throughout the country was about the same as the number employed in the nitrate oficinas alone when they are running at their maximum.

(2) The total power used in manufacturing in 1914 was almost exactly the same as the Chile Copper Company alone is now using for its operations at Chuquicamata. The World War stimulated manufacturing somewhat, and by 1920, the number of persons engaged in it had increased 60 per cent. The growth is better shown by noting that the power employed nearly tripled in the 6 years. This indicates a movement away from the workshop type of manufacturing in the direction of factory manufacturing. Yet the average number of persons to the manufacturing establishment was only 10, and the average production

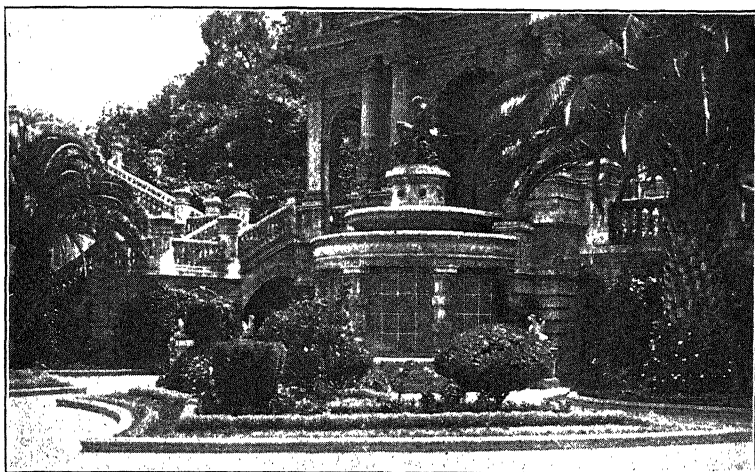


FIG. 88.—Estatua de Neptuno, one of the many beauty spots of Santiago, capital of Chile.

per factory was valued at less than \$20,000, United States money. By 1925, there were in Chile upwards of 3,000 establishments that might be called mills and factories, though only a small proportion of these employed as many as 100 persons. About one-third of these actual mills or factories are in or near Santiago, and half as many are in or near Valparaiso. The provinces of Concepcion and Valdivia, in the southern portion of the Central Valley, are the other manufacturing regions. It should be noted that the smelting and refining of copper and the extraction of nitrate are classed with the mining rather than with the manufacturing industries.

Chile has made notable progress in the manufacturing of shoes, using the most modern American machinery in the leading

factories. Seventy-five factories in 1924 produced more than 6 million pairs of shoes. Exports of shoes to Peru and Bolivia are of increasing importance. Over 300 tanneries supply leather. The manufacture of wine, alcohol, and liquors is a large industry. Upwards of 100 plants are engaged in making gas and electricity. Flour mills provide practically all of the country's needs in this line; six good-sized woolen mills and a large number of cotton textile mills have been established. The great difference between a highly developed industrial nation like the United States or Great Britain and a slightly developed one like Chile may be seen in the fact that the annual manufactures of the former are \$500 per capita of their populations, and those of Chile \$35.

Chile seems the best endowed of all the South American countries, except possibly Brazil, for becoming a manufacturing

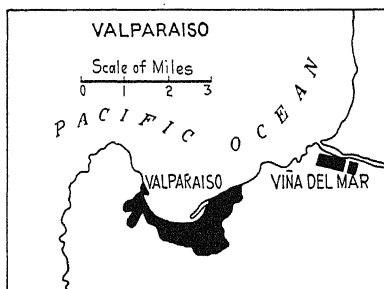


FIG. 89.

nation. Its invigorating climate, its energetic people, its resources of coal, iron, copper, and water power; its wool, hides, wheat, fruit and other raw materials; its progressive policies, and increasing capital are all in its favor. Its protective tariff may enable it to develop the manufacturing of goods for its own people, but there are only a few millions of these; and it can scarcely be expected that Chile will export manufactures, except to its less developed neighbors. Placing the value of Chile's manufactures at 125 million dollars, it is to be remembered that many a single corporation in the United States, England or Germany has an output larger than this.

Foreign Commerce.—Certain characteristics of the foreign commerce of Chile stand out prominently:

1. The balance of trade is regularly in favor of Chile, and usually it is heavily so.

2. Mineral products constitute 90 per cent of the value of all exports, while agricultural products, animal products, and manufactures form less than 10 per cent. Nitrate and copper are classified as mineral products but they are also semi-manufactured.

3. The combined trade of Chile with three countries—the United States, Great Britain and Germany—is greater by half than that with all the other countries of the world combined.

4. About half of the foreign trade is with the United States, but Chile sends to the United States much more in value than it buys from this country.

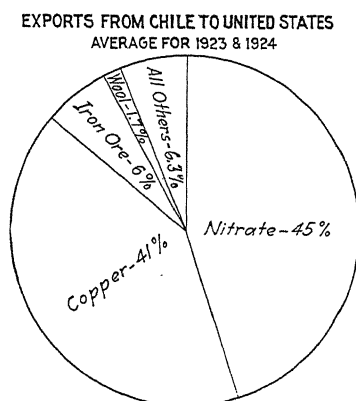


FIG. 90

5. The value of foreign trade fluctuates widely even from one year to another, depending so heavily as it does on the exportation of one product, nitrate.

6. The value of exported products per capita of the population is high, averaging about \$75 a year as compared with \$60 per capita for the United States and \$15 or \$20 for Brazil.

Invisible Imports in Chilean Commerce.—New countries, which possess large natural wealth of soil or minerals and have relatively small populations, as is true of Chile, Uruguay, Australia, and Canada, may become heavy exporters of raw products. Since their respective populations are small, the value of their exports per capita of the population is large. Chile has a small population (about 4 million) but has two articles of export of large annual value—nitrate and copper. The major part of the value of Chilean exports consists of copper, nitrate,

and iron, mined by companies financed with foreign capital and paying the larger part of their dividends to foreign stock holders. In spite of an almost uninterrupted favorable balance of trade, Chile has largely increased her national debt to foreign bond holders, and hence a very substantial part of the value of her exports does not return to the country but remains abroad to pay the interest on these obligations.

Character and Sources of Principal Imports.—Like all South American countries, Chile is, in the main, a buyer of manufactured products. With few exceptions, her own manufacturing establishments have not reached the stage where they can produce economically articles which are made by complex and

FOREIGN TRADE OF CHILE—FOUR YEAR AVERAGE 1921-24

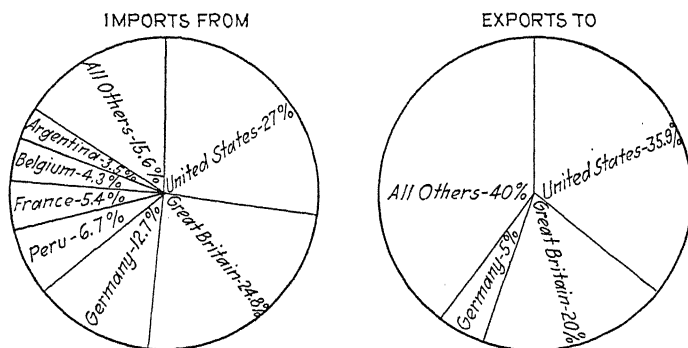


FIG. 91.

expensive machinery or those in which quantity production is essential to economical production. The greater part of the mining machinery, electrical apparatus, industrial machinery, automobiles, locomotives, passenger and trolley cars, and similar manufactures must be built abroad, usually in the United States, Great Britain, or Germany, but also in France and Belgium.

The United States has become the largest source of Chile's imports, with Great Britain a close second. The depressed value of Chilean money in relation to United States money has at times worked against importations from the United States and in favor of German, French, and Belgian goods, and to a lesser degree in favor of British goods. The fact that the United States takes about as large a proportion of Chilean exports as do all European countries combined is likely to keep the United States in first place as a source of Chile's imported goods. It is worth noting

that the little island of Porto Rico buys two or three times as much in value from the United States as Chile buys, and that the Hawaiian Islands, with one-eighth the population of Chile, buy twice as many goods from the United States.

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CHAPTER IX

THE RIVER PLATE LANDS: THEIR PHYSICAL ENVIRONMENT

Extent and Character.—The part of South America drained by the Rio de la Plata, or River Plate¹, and its tributaries is a large area. It extends 2,000 miles from east to west and nearly as far from north to south (Fig. 1). It is smaller than the Amazon basin, but larger than that of the Mississippi. The Amazon lies wholly within the tropics, the Mississippi wholly within the temperate, or intermediate zone, and the River Plate system partly within the tropics and partly within the warmer portion of the intermediate zone. The progress made by the people of each of these three river basins is strikingly different, and the stage of development attained in each is closely related to its climate. The Mississippi basin has about 50 million people, the River Plate less than 20 million, and the Amazon less than 2 million.

The River Plate lands as a whole have three main divisions (Fig. 1), differing notably in geographic and climatic features, and consequently in products. (1) The northern third is mainly tropical lowlands, including the Matto Grosso of Brazil and the Gran Chaco of Bolivia, Paraguay, and Argentina, areas of very sparse population. (2) The eastern branches of the Paraná penetrate the dissected plateau of southeastern Brazil, the most progressive and promising part of that large country. It includes (a) the world's principal coffee belt, (b) the pine forests of the Paraná, and (c) part of the grazing lands of southern Brazil and Uruguay. (3) The third portion contains the great plains of Argentina, one of the most productive cereal and live-stock regions of the world.

The River Plate System.—The second largest river system of South America and one of the great systems of the world is that composed of the River Plate estuary, 195 miles in length, and three great rivers whose waters flow into it, namely, the Paraná (2,000 miles long), the Paraguay (1,500 miles long), and the

¹In using the term "River Plate" the author follows the long established practice of the English.

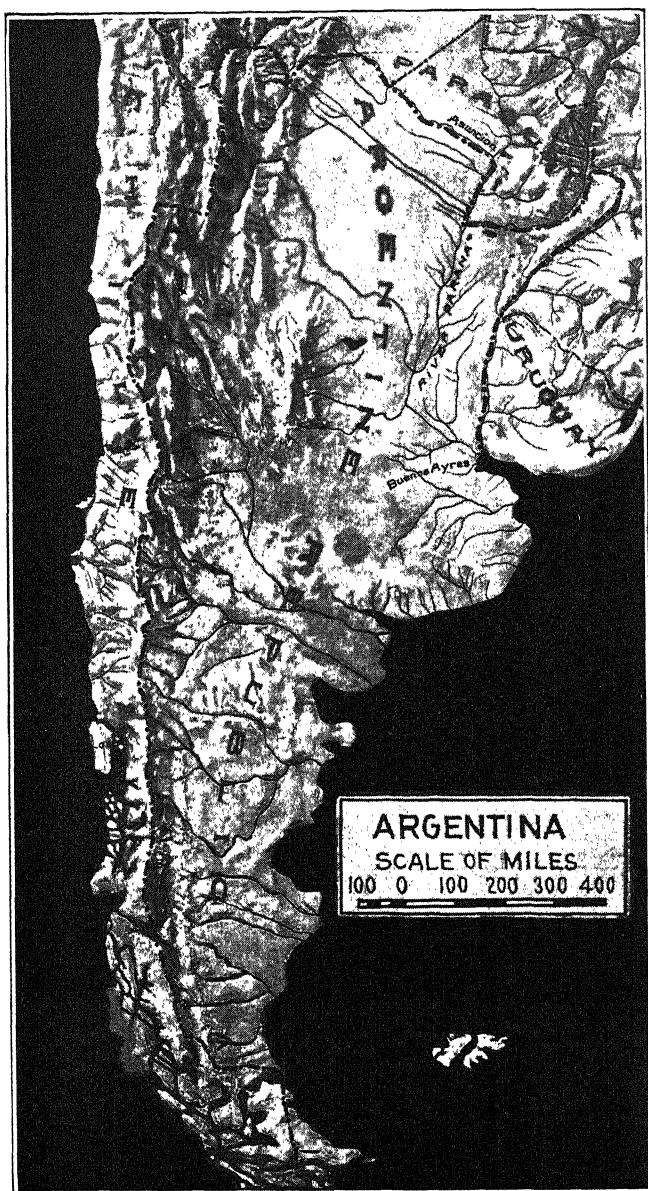


FIG. 92.—Relief map of southern South America. *From model by Howell. Copyrighted 1899 by the Macmillan Co. (Reprinted by Permission.)*

Uruguay (1,000 miles long). The Paraná is longer than the Mississippi and is larger in volume. Regular freight service up the Mississippi ends at St. Louis, 700 miles from the sea, but it extends up the Paraná-Paraguay 1,700 miles.¹ The lower Paraná is a river of great size, carrying ocean vessels of 26-foot draft to Rosario, one of the principal ports of Argentina, situated nearly 400 miles from the ocean. Its great headwater tributaries penetrate such widely separated regions as the coffee district of Brazil on the east and the Andes of Bolivia on the west. Only a few rivers of the world drain a larger area than the Paraná or carry a larger volume of water.

The Paraguay River is of utmost importance to the landlocked country of Paraguay, whose capital, Asuncion, 1,000 miles¹ up from Buenos Aires, is regularly reached by large steamers. During the 3 months of high water, 1,000-ton boats ascend 1,700 miles¹ to Corumba in Brazil, and smaller steamers navigate the river throughout the year. A moderate amount of dredging at a few critical points would enable ocean vessels of 2,000 tons to reach Asuncion throughout the greater part of the year. Even in its present unimproved condition, the river is one of the highly useful rivers of the world. In its course through Paraguay, the river has a width of $\frac{1}{4}$ to $\frac{1}{2}$ mile and is unbridged at any point. Steamship entries into Asuncion reach 1,500 a year, and a large number of other freight-carrying boats, large and small, enter the port. The downstream traffic is much larger than the upstream, causing an unbalanced condition which partly accounts for the high freight rates. It commonly costs more to ship products 1,000 miles by river steamer than to ship them 7,000 miles to North America or Europe by ocean vessel. While the rivers of this undeveloped region are of great usefulness, the cost of transportation on them is much higher than railway rates in the United States. Yet, without these rivers for navigation, a large section of South America would be practically cut off from contact with the outer world, for railways could not profitably penetrate the more remote regions for a long time to come. The one railway that does reach into Paraguay is continuously in financial difficulties and, at the best, can serve only a portion of the country.

Character of the River Traffic.—There are three forest products of this region which supply the greater part of the river traffic;

¹ Distance following the windings of the river.

(1) the pine lumber of the lower Paraná basin; (2) the yerba maté;¹ (3) the quebracho² logs and extract obtained mainly from the Argentine and Paraguayan Chaco. The greater part of the yerba and quebracho is carried southward on the rivers, but a smaller proportion of the lumber. The production of quebracho extract is centered in a limited number of factories strategically located for shipping their products; but yerba is supplied by hundreds of small as well as some large producers, scattered along many rivers and branches. The river boats transport practically all of this, amounting to some 200,000 tons a year. Moreover, such other products—tobacco, hides, oranges, meat—as this section produces in excess of its own needs are shipped to the outer world, mainly by way of the rivers. Even on the small rivers, specially built light-draft boats are propelled from point to point, carrying a few tons of freight. The greater part of the imports is also carried by some one of the river steamship lines which send their boats regularly or intermittently into this interior region.

Control of the River Traffic.—The bulk of the river traffic has passed into the control of a British company that has bought up most of its competitors and nearly monopolizes the river shipping. It is a well-managed, substantial company giving better service than the smaller lines, but the high rates charged cause complaint. The river steamers which reach Asuncion during the low water draw only 6 or 8 feet when loaded, and in a very dry season even less.

The principal passenger steamers between Buenos Aires and Asuncion depart from each city twice weekly. The up-river trip requires 4 or 5 days and the down trip about 3 or 4 days. On the lesser rivers, the steamers may make only 50 to 60 miles a day, stopping anywhere that freight or passengers are to be obtained, using 3 hours or more daily to take on wood for fuel, and possibly tying up at night. Where there is no competition with railroads, rates and fares are high.

A Brazilian company has, at times, operated a line of steamers by way of the Paraná-Paraguay to bring down manganese ore from mines in Matto Grosso. The navigation of the upper Paraná, above the point where it is crossed by the International

¹ *Yerba* means herb and *maté* means a gourd. The yerba maté is a kind of tea which is customarily served in a small gourd.

² *Quebracho* is a species of tree very rich in tannic acid.

Railway, is less important than that of the Paraguay, for the region is very sparsely settled, while most of the population of Paraguay lives along the Paraguay River or not far from it. It is a region of many enormous land holdings, and of great waterfalls, including those of Guayra and of Iguazu which, at times of flood, rival Niagara in grandeur. The region of the upper Paraná in eastern Brazil has enormous potential water power which is being steadily developed. Since the decline of rubber production in the Amazon Valley, the River Plate system is about as important for navigation as the Amazon.

ARGENTINA

Slow Start: Rapid Recent Progress.—Spanish explorers visited the River Plate lands 20 years before they did Peru; and Asuncion, in Paraguay, was founded in 1536, about the same time that Pizarro was founding Lima. After two attempts to plant a permanent colony at Buenos Aires had failed, a group of colonists from Asuncion successfully founded a settlement there in 1580, 40 years ahead of Plymouth colony in Massachusetts. During the colonial period, Argentina was shamefully misruled by its Spanish overlords, and during the first half-century of its national life, internal dissensions retarded its progress. The vast plains of Argentina offered no gold or silver to Spanish adventurers, and they took little interest in crops or cattle. The country was far off the route of the convoyed fleets that yearly passed between Spain and the Isthmus of Panama. Spanish officials insisted that all trade between Spain and the South American colonies be forced to follow that one route to and from Panama so that better protection could be given the treasure ships and merchant ships than could be given if some of them sailed to the remote and little-esteemed River Plate lands. The authorities also hoped thus to prevent smuggling. They sought to compel all trade between Spain and Argentina to pass through Panama and Peru. It was not until 1776, nearly 200 years after the founding of Buenos Aires, that Spain yielded and opened the port of Buenos Aires to normal trading opportunities and erected the colony into a viceroyalty. Up to that date, the trade and growth of the colony were constantly obstructed by the home government. From 1810 to 1816, Argentina was fighting for independence, and later assisted Chile and Peru in their struggle against Spain. For a half-century or more after independence was

secured, the unhappy country was the scene of ever-recurring civil conflicts, and Indian attacks along the frontier were frequent. Thus was the early economic progress of Argentina delayed, and after nearly 50 years of independence, the population had increased only to 1,200,000, or fewer than the state of Indiana had at that date (1860).

In the last half-century, Argentina has had a rapid growth in population and a phenomenal growth in production and in wealth. On the banks of the Rio de la Plata has grown up the modern Buenos Aires, one of the most enterprising and beautiful cities of the world, the metropolis of the southern hemisphere, already nearly three times the size of the largest city of Spain. This new country, whose external commerce the mother country successfully repressed for two centuries, now has a foreign trade four or five times as great as that of Spain.

The Growth and Character of the Population.—Of fundamental importance in considering the population of Argentina is the fact that the people are practically all of European birth or descent. The Indian population was nearly exterminated, and almost no negroes ever were brought in. A very minor fraction of the people have Indian or negro blood in their veins. It is the racial character of the people of Argentina and of Uruguay that sets off these two countries from all others in Latin America.

For reasons already mentioned, the population of Argentina increased very slowly until orderly government was established. After that, European immigration increased rapidly. In 1895, the population was nearly 4 million; in 1915, it had doubled again and stood at 8 million. During the World War and in the years immediately following, the increase was slight. In fact, for 5 years more persons departed from the country than came in. After 1920, the inflow again increased. The country greatly needs immigrants, and the government takes active measures to induce European immigration. In the 10 years from 1904 to 1913, the United States admitted about 10 million immigrants; Argentina, 2.4 million; Canada, 1.5 million; and Brazil 1 million.

Among the immigrants into Argentina, the Italians are the most numerous, with Spaniards ranking second. An increasing number of Germans, Poles, and other non-Latin Europeans are arriving; there are few Asiatics. Under Argentine laws, the children born of foreign parents in Argentina become automatically citizens of the country. The half-breeds (Indian and

white) known as the gauchos are disappearing and now number scarcely 200,000. There are about 36,000 civilized Indians and a few small tribes of uncivilized Indians. Of all the countries of the western hemisphere, Uruguay and Canada possibly excepted, Argentina has the largest proportion of people of European stock, mainly south European, whose languages are similar and who learn Spanish readily.

Illiteracy among the immigrants is high. Schools for the children exist in the cities and villages, but in the open country with its long distances and sparse population, schools are few,



FIG. 93.—Since the end of the World War, immigration into Argentina has again exceeded emigration from it.

except on estancias which have a considerable number of colonist families. Here, some sort of schooling may be obtained.

In Buenos Aires alone live 20 per cent of the entire population of the country, and this city attracts and holds an altogether disproportionate part of the population. Neat farm houses and well-kept rural villages which are so conspicuous in the farming regions of the United States are notably lacking in most of Argentina. The country people are still, in a large degree, a tenant and migratory population.

The Dominant Influence of Climate.—Argentina lies almost wholly within the intermediate zone, the most significant fact in the geography of the country. Its northern end extends 100 miles into the tropics, and certain small islands, far south of Cape Horn, lie within the south polar zone; but the great central plain, the heart of the nation, lies in middle (temperate) latitudes, the only latitudes in which great nations exist; the only climate in which aggressive, energetic peoples develop.

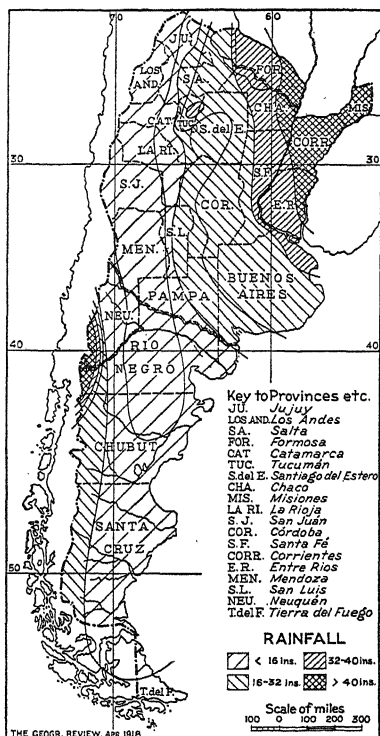


FIG. 94.—Rainfall map of Argentina. (Courtesy of W. S. Tower and the Geographical Review, published by the American Geographical Society of New York.)

THE COUNTRY AND ITS GEOGRAPHICAL REGIONS

Large Extent.—Second largest of the Latin American countries, Argentina has a land area (1,136,000 square miles) equal to the part of the United States lying east of the Mississippi River. It is five times the size of France. Large area is an asset to a country because of the greater and more varied production of wealth

of which it is capable, and because of the greater population that it can sustain. The Argentines believe their country is capable of supporting in comfort 100 million people, though at present there are less than 10 million. From north to south, the country covers 33 degrees of latitude or 2,200 miles, and its maximum width of 900 miles equals the distance from New York to Chicago. The country comprises four major geographical regions which are determined mainly by climate. These are: (1) the humid and semi-tropical north, including the principal forest lands of the country; (2) the arid and semi-arid west; (3) the dry and wind-swept steppe lands of Patagonia; (4) the level and fertile Pampa.

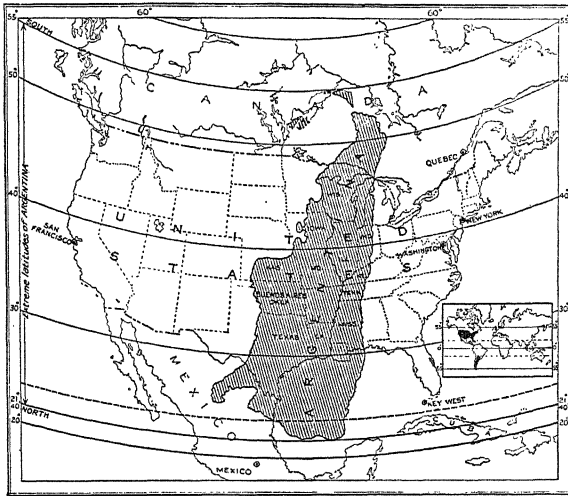


FIG. 95.—Argentina superposed on the United States, showing relative latitudes and areas. (*Bull. Pan-Am. Union.*)

The Tropical and Semi-tropical North.—This province includes about 20 per cent of the total area of Argentina. Here, snow never falls. In the lowlands, frost rarely occurs, and palms thrive. The summers are extremely hot. It is a region of moist lowlands, partly forests, partly savannas. It includes the greater part of two provinces and four territories, and extends south to the thirtieth parallel. A part of it, known as the Chaco, contains the quebracho forests, and farther east are the *yerbales* or yerba-growing lands. Agriculture is springing up, but the forest industries are still the most important. The greater

part of this region forms one of the most backward parts of the republic. On the savannas are large herds of native cattle, immune to the Texas fever carried by the cattle tick. Cotton cultivation is making notable progress. The eastern part of this province has heavy rainfall and exceedingly sultry summers. It will be slow in developing, for it is not an attractive region for European immigrants. So long as the cattle tick infests the region imported cattle cannot replace the native cattle. Chiefly because of the adverse elements of climate, this northern province has an average density of population of about 3 or 4 to the

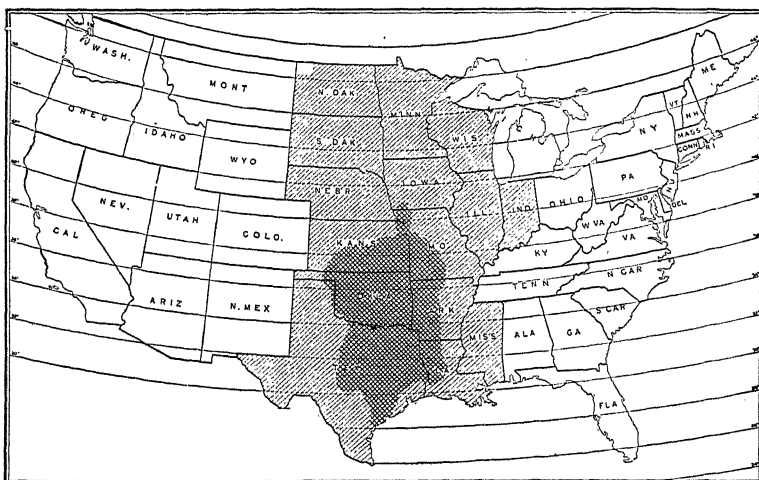


FIG. 96.—Lightly shaded section represents the total area of Argentina. Heavily shaded part represents the cereal area. (*Pan-American Union.*)

square mile. The present wealth-producing ability of this northern 20 per cent of Argentina is not large, but there are undeveloped areas which are suited to tropical and semi-tropical agriculture, especially to cotton.

THE FORESTS

Argentina is seldom thought of as a country possessing forest wealth; yet in this respect, it ranks third in South America, and in value of products exported, it is a close rival of Brazil for first place. Since the principal forests of Argentina are in the north, the subject of forests as a whole is treated here.

Extent and Location.—Somewhat more than one third (36 per cent) of the area of Argentina is classed as forest land, but

much of this is very thin, and probably not over half of the land so classed contains much merchantable timber. By far the most valuable of the forests are the quebracho forests of the north. This tree grows only where the annual rainfall is 25 inches or more, and where the temperature is semi-tropical. The region shown in Figure 10 is the only part of the world where these forests are known.

In the region between the Paraná and Paraguay rivers (the Argentine Mesopotamia) are forests of considerable density. The trees are mainly hardwoods, but in the extreme north, the Territory of Misiones contains 3,600,000 acres of the Paraná pine, the most useful construction timber growing in this part of South America. This region also contains the yerba groves.

Along the Argentine slopes of the Andes of Patagonia are forests of future value but of small present value because they are in an out-of-the-way location. Besides these forests, large areas of the land are covered with a scrub growth (monte).

FOREST AREAS OF SOUTH AMERICA (ZON)

TROPICAL HARDWOODS 1,61300 sq.mi. 53%	QUEBRACHO 404000 sq.mi. 13%	PARANA PINE 309000 sq.mi. 11%	SUBTROPICAL HARDWOODS 9%	GREENHART - MORA 8%	CHILEAN PINE-BEECH 3%	MAHOGANY FOREST 2%
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Fig. 97.—Compare with forest map, Fig. 10.

The greater part of the Argentine forest land is owned by private individuals and corporations. Only about 8 per cent is still retained by the government. The native forests supply only a small fraction of the lumber used in the country. This is due in part to the difficulty and cost of bringing the native timber to the Pampa region where most of it is needed, and partly to its inferior quality for construction purposes. Argentina imports more lumber and timber than all of the other South American countries combined, and most of it comes from the United States. In 1924, for example, Argentina was the largest foreign buyer of yellow pine from the United States, importing 181 million board feet.

In the semi-arid west are thin mixed forests containing relatively few large trees; this timber is useful for fuel and posts and is somewhat used for local construction purposes. It is not

an important forest region, however, and much of the included land is used for pasturage.

Quebracho.—At present, the most valuable forest product of South America is derived from the quebracho tree whose wood is very rich in tannic acid. With the progressive disappearance in the United States of hemlock, oak, and chestnut, which long produced the chief vegetable tanning extracts, quebracho extract came more and more into use. As a tanning substance, it has certain elements of superiority, three of which are: (1) the rapidity with which it accomplishes the tanning process; (2) the fact that it considerably increases the weight of the leather; and (3) the great quantity that is readily available. It is commonly

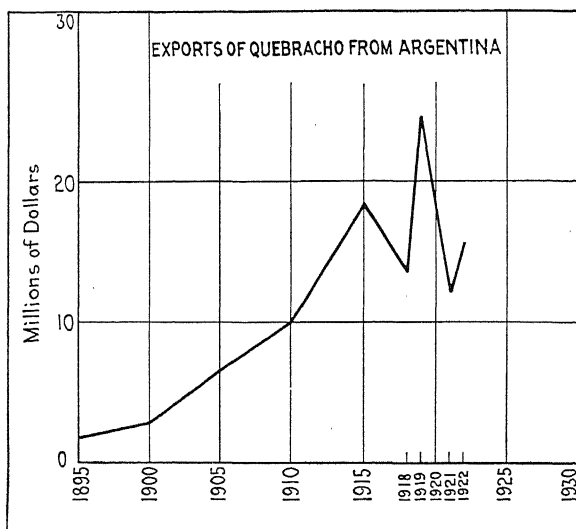


FIG. 98.—The value of the tanning extract, quebracho, exported from Argentina exceeded the value of rubber exported from Brazil in 1923.

used in combination with other tanning fluids, such as those made from oak and hemlock bark. The highly concentrated nature of quebracho extract may be judged from the fact that one average quebracho log contains as much tannic acid as 3 or 4 tons of oak bark.

Quebracho is a very hard and very heavy wood. The name means "break ax," and the steel used in tools for cutting this wood must be specially tempered. It is 25 or 30 per cent heavier than water, and, consequently, the logs cannot be floated on

the rivers. There are several species of the tree, but the tanning extract is made from the *quebracho chaqueño*. Tannic acid is contained in both the bark and sapwood; yet the heartwood is so much richer in this substance that the bark and sapwood are cut away and only the heartwood is used. The logs are hauled by oxen to narrow-gage railways, on which they are taken to centrally located factories where they are reduced to fine chips. These, in turn, are treated with hot water or steam at high pressure. The resulting dilute extract is evaporated, and a brown solid is obtained. This is moulded into cakes weighing 100 pounds or more, wrapped in jute bags, and shipped. Since 20 to 24 per cent of the heartwood is tannin, the better logs yield upwards of 500 pounds of the solid extract, which sells at widely varying prices; a fair average is \$80 a ton, or 4 cents a pound. The greater part of it goes to the United States and Germany through River Plate ports, especially Buenos Aires. One strong British company holding 5 million acres of land has dominated the industry in Argentina, producing nearly half of the total output and, at times, being able to dictate prices, which, during the World War, reached a fabulous height and yielded very large profits. Some years after the war, prices collapsed, and profits temporarily disappeared. An American company holds upwards of 1 million acres of land in the Chaco. It has 50 miles of railway and provides for a population of about 5,000 people. Its activities, however, are not confined to the production of quebracho.

One of the oldest companies operating in this region is an Argentine corporation which bought, for about 2 cents an acre, 22,000 square miles of land in Paraguay, an area equal to that of New Hampshire, Massachusetts, and Connecticut combined. In this central part of South America are some of the largest private holdings of land anywhere known.

The quebracho trees grow abundantly in the northern provinces and territories of Argentina and in part of Paraguay. The quebracho region is definitely limited by the parallels 20° and 31° and covers approximately 100 million acres, about half of which is forest covered. There are only four or five usable quebracho trees to the acre. The favorite habitat is on the better-drained lands back from the rivers. The supply is believed to be sufficient for a century to come.

Six extract plants in Paraguay produce about one-fifth of the total output, the remainder coming from Argentina. The

average annual exportation exceeds 200,000 tons valued at 16 million dollars or nearly double the value of the rubber from the Amazon Valley (1924). At one time, large quantities of quebracho logs were shipped abroad, but the installation of extract factories in the immediate region has largely done away with the uneconomical practice of exporting the logs.

The wood has other uses than supplying tanning extract. It is very resistant to decay and makes durable cross-ties and fence posts, but the wood is too valuable for its tannic acid to be freely used for any other purpose. A quebracho railroad tie selling for \$3.50 contains twice that value of extract.¹

COTTON

Rapid Increase of Cotton Production.—In the north of Argentina is a region containing 165,000 square miles, much of which is excellently suited to the cultivation of cotton. This is an area as large as Georgia, Alabama, and North Carolina combined. Already cotton growing in the territory of the Chaco is well started, and the acreage is increasing rapidly.

The Chaco is a region of intermingled grass lands and forests. Open spaces of 10,000 to 50,000 acres are common. The land is fertile, and the rainfall is sufficient; the growing season is 10 months long, and hard frosts are rare. American cotton seed from Louisiana has been introduced, and a good grade of cotton is being grown. The yield per acre is high, averaging nearly double that in the cotton belt of the United States. Most of the planters are recently arrived settlers who cultivate rather small plantations upon which they and their families do most of the work. On the occasional large plantations, Indian labor is employed, for Indians are still quite common in the Chaco. This labor is cheaper than that in the United States, and the cost of producing the cotton is lower. The more intelligent planters are making large profits, for land is cheap, taxes are merely nominal, and government aid is extended; this includes the services of an expert adviser from the United States. The boll weevil is not known, but the pink boll worm is reported. The chief pest is the locusts which swarm over the country in count-

¹ For detailed description of the quebracho industry, see pp. 83-92, *Special Agents Series* 199, U. S. Dept. of Com., 1920; also *The Geographical Review*, vol. 14, pp. 227-241 (1924), article by William D. Durland on The Quebracho Region of Argentina.

less millions and at times do great damage. They are fought by the settlers, but with only temporary success. However, the planters are succeeding, and are doubling their output of cotton every 2 or 3 years. In 1924, the yield was approximately 100,000 bales of ginned cotton, as compared with one-tenth that quantity only 7 years earlier.

One serious handicap is the deficient means of transportation. Only two short lines of railway penetrate the Territory of El Chaco. It is now a frontier region but has a promising future. The quantity of cotton grown exceeds the requirements of the Argentine mills, and an export trade has developed. The Argentine government is very hopeful that a great wealth-producing industry can be built up in this moist, hot region where cereals, blooded cattle, and sheep do not thrive.

(For references, see end of Chap. XII.)

CHAPTER X

THE ARGENTINE PAMPA AND PATAGONIA: THE LIVESTOCK INDUSTRIES

THE PAMPA

Extent and Character of the Pampa.—The southern half of the Argentine plain is known as *La Pampa*, which in that country signifies “the plain.” This particular Pampa occupies between 20 and 25 per cent of the area of the republic. It is one of the most fertile areas in the world and is the heart of the Argentine nation. Reaching from the thirtieth to the fortieth parallels, it has a north-south length of 700 miles, and may be considered to extend from the Atlantic westward 400 miles to the line of 16 inches of annual rainfall, beyond which level land still continues, but the country is semi-arid and is clothed with scrub (*monte*). The Pampa proper is so level that, as far as the eye can see, it is a featureless plain, originally without a tree, but now dotted with groves which have been planted to protect estancia¹ buildings. The Pampa comprises about 25 per cent of the area of Argentina. The city of Buenos Aires lies almost on the thirty-fifth parallel, and so is midway between the northern and southern limits of the region. In this city, snow falls only in occasional winters, and frosts are rarely severe enough to kill the beautiful palms in the plazas and gardens of the city. In Buenos Aires, freezing temperatures occur on only 10 or 12 days a year. The mean winter temperature (July) is 40°F., the same as that of Savannah, Ga.; but the cold “northers” which occasionally visit Savannah and ruin the orange groves of Florida have no equally severe equivalent in Buenos Aires. Nowhere on the Pampa does the temperature ever fall to zero Fahrenheit. Houses are almost never heated, although there are days in winter when real comfort would require it. The region has from 16 to 40 inches of annual rainfall, and is nearly all capable of cultivation.

¹ The estancia is an estate devoted mainly to live stock. The proprietor is an *estanciero*.

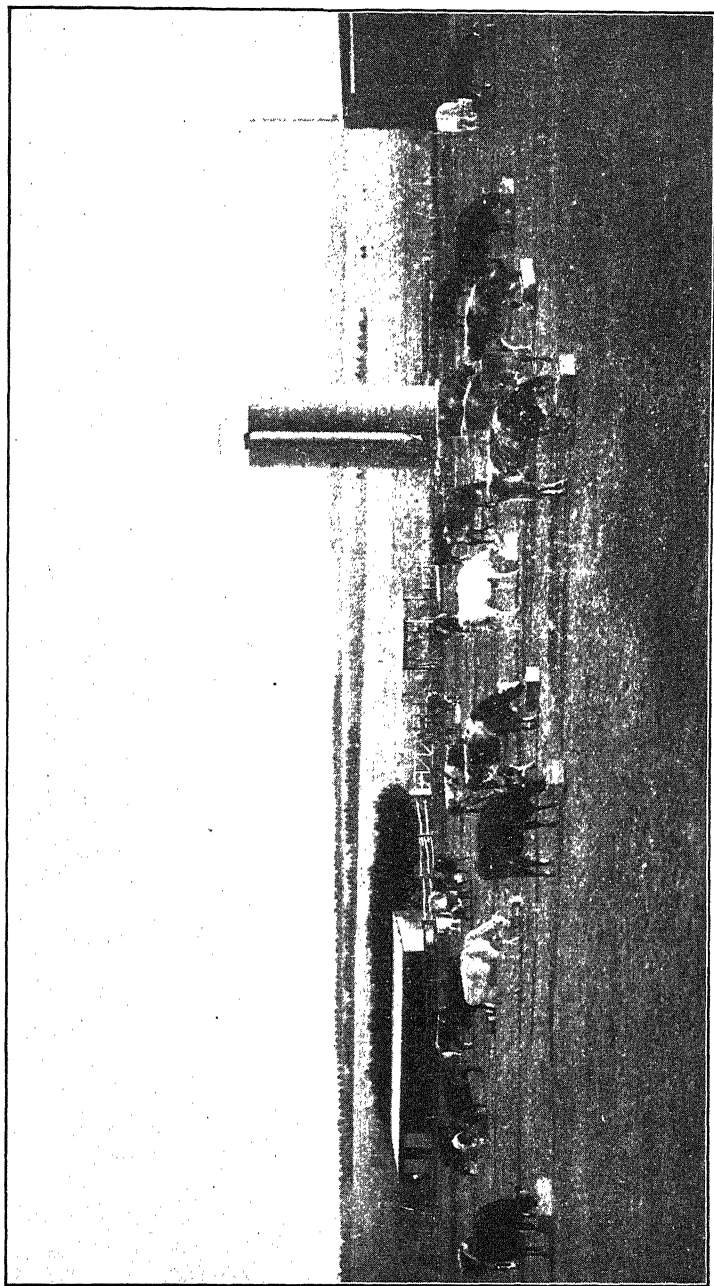


FIG. 99.—Scene on a cattle estancia on the pampa of Argentina. (Photo. by H. G. Olds.)

Nearly Ideal Geographical Conditions.—It would be difficult to find anywhere in the world a large area so well suited to the raising of cattle as is the Argentine Pampa. (1) The mild temperate climate permits grazing all of the year, and no buildings are required to shelter the animals. (2) The Pampa is a vast natural pasture, originally carpeted with native grasses, now greatly improved by the introduction of alfalfa. (3) The Pampa lies close to the sea, not in the continental interior, as is true of the chief grazing lands of North America. This facilitates the exportation of live-stock products. (4) The pastures of the semi-arid region, including those of Patagonia, are better suited to sheep raising than to any other use, and the ease with which corn and alfalfa are grown on the Pampa is favorable to the raising of swine: this branch of the animal industry is making rapid progress.

In addition to these geographical advantages are: (1) the fact that the social standing and prestige of the estancieros is high, for they are the "blue blood" of Argentina, while the tiller of the soil has enjoyed no such prestige; (2) the fact that stock raising is the oldest of the Argentine industries; and (3) the fact that the enormous land holdings favor this industry. In no other important country except Australia do the live-stock industries play so large a part in the economic life of the country as they do in Argentina, and this is in large measure due to geographical causes.

Little Surface Drainage.—So gentle is the eastward slope of the Pampa that the surface drainage is imperfect. Of six fair-sized rivers rising in the Cordoba highland and flowing eastward, only one reaches the Paraná. No large river anywhere crosses the Pampa, and over thousands of square miles not a stream is seen. If the rainfall is heavy, the surface water spreads in sheets over the land and slowly seeps into the soil or gathers in shallow lakes. This deficient drainage is one of the few unfavorable features of the Pampa, but characterizes only a part of it. It has, however, important compensations; for most of the rainfall soaks into the ground and thus raises the surface of the ground water and helps to keep alfalfa pastures green.

Fine and Fertile Soil.—The Pampean formation of unconsolidated clays, sands, and loams is of great depth and rests upon an irregular rock base which protrudes above the Pampa in the hills of Cordoba and those of the southern part of Buenos Aires

province. The origin of the Pampean formation has puzzled all investigators. A well boring at Buenos Aires penetrates over 1,000 feet of unconsolidated deposits, and one near Santa Fé penetrates a still greater depth of such deposits. Parts of this formation are clearly alluvial, but rarely do they contain any gravel except along the present rivers. Over large areas, the soils are exceedingly fine and are believed to be chiefly wind blown. Some of the material is dust or ash of volcanic origin. The fact that the soil is like loess in the east and is increasingly sandy toward the west supports the theory of wind-blown origin. Denis says there is loess 660 feet deep at Rancul in the east, while at Telen in the west, the sand, marl, sandstone, and gravel is 2,800 feet deep. He believes the main mass of the Pampean deposits is probably of Andine origin.¹ The levelness of the land, the fineness, porosity, depth, and fertility of the soil, the well-distributed rainfall, and the mild winters make the Pampa one of the most nearly ideal farming regions of the world.

The underground waters are of unusual importance in the Pampa. Along the low banks of the Paraná, in the southeastern part of Buenos Aires province and in many other places, the water table comes to the surface, and much swampy land exists. In the slightly higher land, the water table is from 5 to 10 feet below the surface in a season of average rainfall. Progressing toward the west, the land surface slopes gradually upward; the soil is coarser and more porous, and the water table in the western part of Buenos Aires province, in the eastern part of Córdoba, and in the southern part of Santa Fé is 7 to 15 feet below the surface. Still farther west and southwest, it is far below and can be

¹ "The Pampean formation consists almost entirely of loose deposits, sands and clays of various sorts. There is no gravel . . . River deposits strictly so-called, estuary deposits, lagoon deposits, aeolian deposits, aeolian deposits redistributed by water, river deposits redistributed by wind—all these different types are represented in the Pampean formation, but their relative importance is still disputed." PIERRE DENIS, *The Argentine Republic*, pp. 167, 168, 1922.

"The chief ingredient of the Pampean formation is loess, that is, fine, sandy, fine-grained clay from light to dark gray in color, in which horizontal stratification cannot be recognized." . . . A general feature of the Pampean system is that the soil is very often so saturated with salt that it gives rise to a white efflorescence like snow, and gives a brackish taste to subterranean water. FRANCISCO LABZONA, *Agricultural and Pastoral Census of Argentina for 1908*, vol. 3, p. xxiii.

reached only by deep borings. This reservoir of underground water, lying relatively near the surface in the porous sandy soil of the midwestern Pampa, is of incalculable value, for it makes possible the remarkable growth of alfalfa whose roots penetrate downward to this unfailing reservoir of water. In places, the Pampa water is saline. Wells only a few rods apart may yield respectively sweet and brackish water. Great numbers of wind mills pump water for watering the stock. In fact, the presence of potable water is one of the important elements in the value of the land. As a whole, the Pampa is fortunate in this respect.

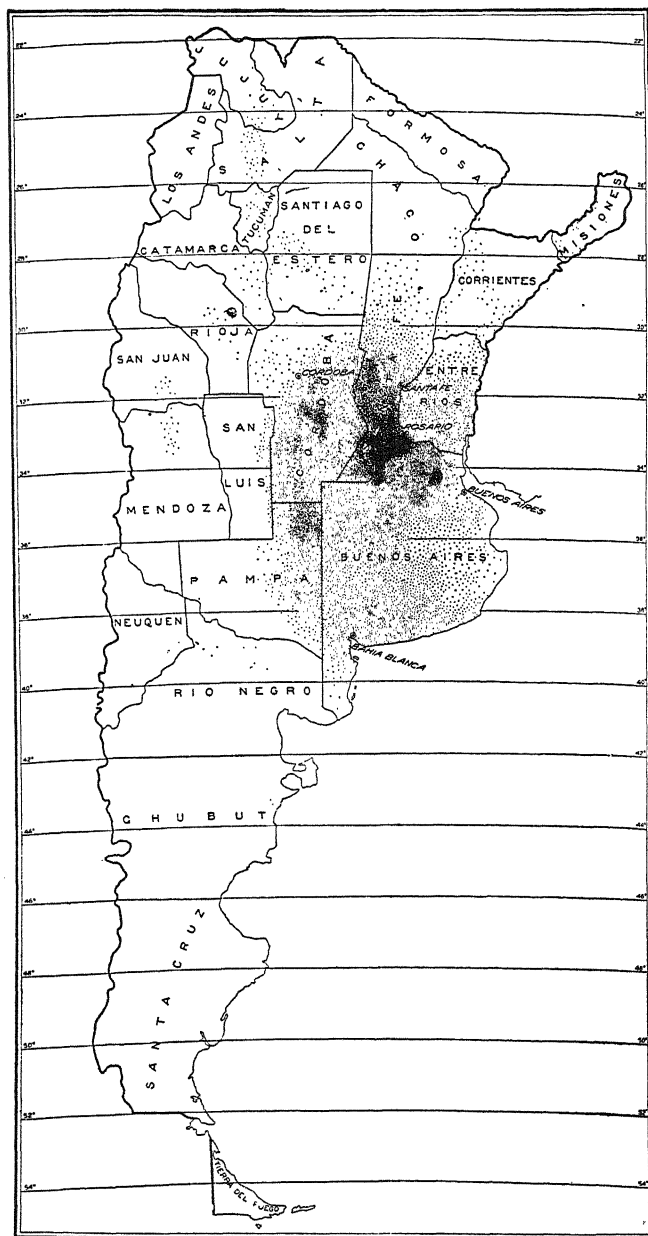
Economic Development of the Pampa.—Fully half of the Pampa is included in the large province of Buenos Aires, the queen province of the republic (Fig. 100). The part lying in southern Santa Fé and eastern Córdoba also is excellent agricultural land. Level, fertile, usually well supplied with rainfall, and lying close to the sea, this region is one of the garden spots of the earth. The Pampa contains far more miles of railway, more industry, and more wealth than all the rest of the republic, and more than half of the people. It may almost be said that the Pampa is Argentina.

CATTLE

Early Cattle Raising in Argentina.—The early Spanish settlers brought sheep, cattle, and horses to the River Plate lands. In a few decades, the Pampa became the home of great numbers of wild horses and wild cattle, and the Argentine gaucho or cowboy was more a hunter of wild cattle and horses than he was a herdsman. These cattle were the descendants of the lean, bony, long-horned Spanish cattle whose hides were about the only salable part. Later, tallow and jerked beef¹ also became exports. Between 1800 and 1825, as many as 2,000 men were regularly engaged in hunting wild cattle. Among the chief exports of the River Plate lands during the latter part of the period of Spanish control were cattle products. The jerked beef was sent largely to slave-holding colonies, such as Cuba and Brazil. The ever-recurring periods of civil strife down to about 1860 prevented any large development of the grazing industries of Argentina, and the modern phase did not begin until after that date. The *saladeros*²

¹ Lean beef preserved by drying and salting.

² Slaughtering and preserving plants where jerked beef is prepared.



Each dot represents 1,000 hectares, or approximately 2,500 acres.

FIG. 100.—Map showing the provinces of Argentina and the location of the cereal zone, including wheat, corn, flax and oats. (*Pan-Am. Union.*)

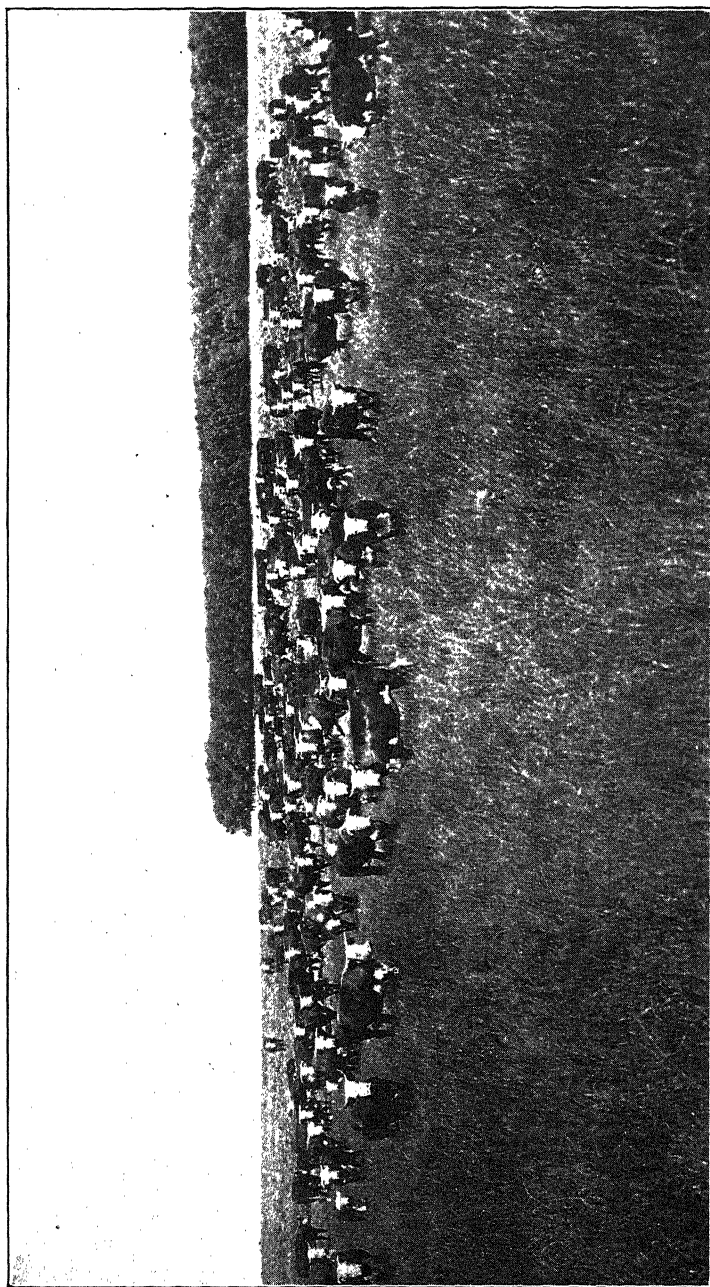


FIG. 101.—A herd of fine beef cattle on the Argentine Pampa. Argentina is the leading beef-exporting country. (*Copyright Ewing Galloway, N. Y.*)

were the principal packing plants in the nineteenth century, and they still exist.

Better Cattle and More of Them.—The importation of high-grade European cattle (mainly British) began in a small way as early as 1860 and increased steadily. The English Shorthorn is the favorite on the good pastures, but Herefords are preferred

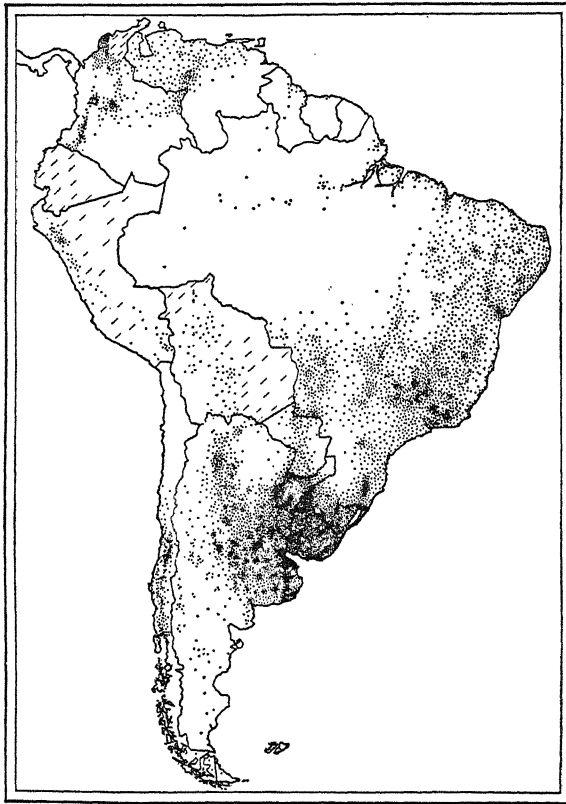


FIG. 102.—Distribution of cattle in South America. They are most numerous in the River Plate lands and the highlands of eastern Brazil. (*Pan American Union.*)

on the rougher and poorer pastures. Shorthorns constitute over 60 per cent of the total. Today, the Argentine beef cattle are among the very best, and in the cattle shows of Buenos Aires are exhibited pure-blood bulls that sell for \$25,000 to \$40,000 each. So great has been the demand for the superior breeds

from Europe and the United States that as many as 150,000 purebreds have been imported into Argentina in a single year.

Another factor leading to the improvement of the stock has been the fencing of the pastures and the raising of alfalfa. When the cattle roamed at will over the unfenced pampa, no control of breeding could be maintained. The cattle were wild and unruly and did not take on fat. Later, the practice of fencing a part of the pastures, raising the nutritious alfalfa, and carefully controlling the breeding of the cattle led to the rapid improve-

ment of the stock and to the present high quality of animals on most of the great estancias.

In 1875, Argentina had 13 million cattle; in 1895, 22 million; and in 1922, nearly double that number or 37 million.¹ Seventy-five per cent of them are in the five pampa provinces. The greatest stimulus to this improvement has been the refrigerator ship which opened the European market to Argentine beef.

The Cattlemen's Difficulties.—

Great as are the advantages of Argentina for cattle raising, there are also difficulties. In the warm, almost semi-tropical, temperatures of northern Argentina, parasites and cattle diseases spread easily.



FIG. 103.—(U. S. Dept. of Agr.)

In a warm climate, pests and diseases are difficult to combat. North of the thirtieth parallel, the cattle tick abounds, and only the native cattle are immune. From this region, no cattle are permitted to be brought south of a certain line until they have been dipped in a bath containing a chemical that kills the ticks. This parasite breeds in wooded lands and decreases as the land is brought under tillage. The dreaded disease, anthrax, often breaks out after a prolonged drought, and terrible epidemics of foot-and-mouth disease occasionally sweep large areas. Cattle must be watched carefully also for signs of tuberculosis. It is

¹ An Argentine official estimate but probably somewhat too high.

an unfortunate fact that the more highly bred the animals are, the more readily they become a prey to diseases, and Argentina's well-bred cattle are no exception.

A second handicap to cattle raising in Argentina is its dependence upon foreign markets. The Argentine population is relatively small and can consume only a small portion of the meat that is produced. If European peoples, for any reason, seriously cut down their importation of meat, as they did following the World War, the export market for Argentine beef collapses, and prices may drop to a ruinous level. In 1921 and 1922, the beef-cattle industry in Argentina suffered a setback that shook the

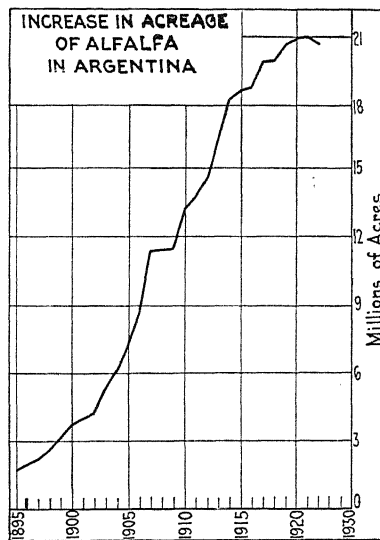


FIG. 104.—Alfalfa, the basis of the Argentine cattle industry, grows luxuriantly in parts of the Pampa.

financial foundations of the country. On the whole, however, the industry is usually prosperous and profitable. The Argentine ranchmen can deliver beef cattle in Buenos Aires at 60 per cent of the cost of producing cattle in the United States and delivering them in Chicago. Argentine beef is sold in London as cheap as American beef is sold in New York.

The Great Importance of Alfalfa.—Alfalfa has worked a miracle in Argentina. As a crop, it is a perfect adaptation to the soil and climate of a large part of the country. The modern cattle

industry has been built up on this crop. Already alfalfa occupies 20 million acres of land, or more than any other crop. On single estancias, 30,000 to 40,000 acres are grown, and in a few cases the acreage reaches 60,000. It is grown widely throughout the country but is at its best in the western half of the Province of Buenos Aires and adjoining parts of Santa Fé, Cordoba, La Pampa, and in San Luis—regions of moderate rainfall and loose soil, in which the underground water is within reach of the roots of the alfalfa. Millions of acres of nearly waste land have been redeemed by this remarkable legume whose nitrogen-fixing ability causes it to enrich the land upon which it grows, and whose water-finding ability enables it to thrive when other plants die. A goodly portion of the alfalfa land, however, is also good cereal land.

The estanciero seeks to place as much land as possible in alfalfa. This is usually accomplished by renting parts of the estancia to "colonists" or farmers (usually Italians) who plow the land and sow cereals or flax for a few years and then leave the land with a new crop of alfalfa. Thus, with little cost or trouble, the owner increases his acreage of this preferred crop. The colonist then moves on to another estancia and repeats the process. If he is successful for a period of years, he may become a land owner, and many of these immigrant colonists have themselves become wealthy estancieros, but the majority fare poorly and constitute a discontented class.

Under favorable conditions, alfalfa lasts 10 to 15 years in the same field, during which time it is both pastured and cut for hay. It grows almost continuously and may be cut from three to six times a year. The dried hay is stacked for winter use or is baled for shipment. Green alfalfa is also stored in silos and fed green as silage.

On pastures whose wild grasses would support only one animal on seven or eight acres, alfalfa supports five or six animals. The land is thus increased several times in value and possibly makes its owner a millionaire. Argentina is a land of droughts, and Alfalfa is the most drought-resistant of crops because of its deep-rooting habits. Cattle fed on alfalfa are fat and ready for market a year sooner than those fed on the wild grasses, and no grain feeding is required. Argentine beef is equal in quality to the very best corn-fed beef of the United States and by some it is considered superior. Alfalfa is the greatest wealth

producer in Argentina, far outdistancing in value the gold of all the Andes in the days of their greatest production.¹

The Increase of Dairying.—During the years following 1910, dairying had a notable growth in Argentina. The favorite dairy cattle are Holsteins, and they are most largely raised in the vicinity of Buenos Aires, which is the region of largest consumption of milk, butter, and cheese, and the city of largest export trade. As a branch of the animal industry, dairying is less scientifically developed than it is in the United States and Europe, but it is making steady advances. Nearly all of the butter, cheese, and casein factories are large, centrally located plants. The small cooperative factories, so numerous in the

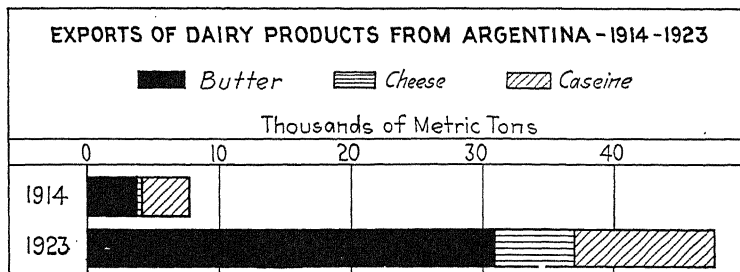


FIG. 105.—The growth of dairy exports from Argentina has been rapid since 1914.

dairy sections of the United States, are practically unknown in Argentina. This is partly due to the warm climate which requires careful cooling and handling of the milk, and this is most efficiently done in large, well-equipped plants. These are numerous in the Federal District and in the Province of Buenos Aires with its excellent railway service. Factories are also increasing in other sections, especially in Santa Fé, Cordoba, and Entre Rios.

The exportation of dairy products from Argentina has increased rapidly and has passed 60 million pounds of butter, 15 million pounds of cheese, and 25 million pounds of casein a year. Great

¹ "Without alfalfa, Argentina would occupy an unimportant place as a beef producer in the markets of the world. Alfalfa has redeemed to profitable use millions of acres of land that would otherwise be unproductive . . . As soon as a brief experiment demonstrates the adaptability of a new region to alfalfa, there is a grand rush to get it. Land jumps incredibly in value; thousands of acres often change hands several times a year with valuations doubled at each exchange." F. W. BICKNELL, *Alfalfa and Beef Production in Argentina*, Dept. Report 77, U. S. Dept. of Agr., p. 5, 1904.

Britain and the United States are the leading importers of these products. So favorable for dairying are most of the conditions in Argentina that these products are likely to be increasingly important in the exports of the country. The chief hindrance is the shortage of agricultural laborers, which dairying operations require in large numbers.

HORSES, SWINE, GOATS, AND SHEEP

A Land of Many and Good Horses.—There are more horses in Argentina than in all the rest of South America, and a high proportion of them are good horses. The Pampa, with its vast landed estates, has ever been a land for the man on horseback. The gaucho, or Argentine cowboy, almost lived on his horse. Today, the most famous and wealthy club south of the equator is the Jockey Club of Buenos Aires, and one of the most popular of sports is the horse race. In the cities and on the estancias, one is impressed by the fine, powerful horses that are seen everywhere. In Argentina, there is a horse for every man, woman, and child of the entire population. Since 1895, the number has practically doubled. On a single estancia may be found from 1,000 to 2,000 horses. On some estancias, the owners make a specialty of breeding race horses and on others, draft horses. As a rule, the farm horses are not fed grain but live on forage, mainly in the pastures; they are usually worked only a half-day and are replaced by fresh horses the second half-day. Considering the quality, horses are cheap in Argentina.

Not Yet a Country of Many Swine.—Notwithstanding the nation-wide interest in cattle, sheep, and horses, and notwithstanding the great quantities of corn grown in the country, the Argentines have not yet taken to swine raising on a large scale. Practically all conditions are favorable for the development of this branch of the animal industry. Corn and alfalfa, the best of feeds for hogs, are cheaply grown; the mild winters require no buildings for shelter; the cost of labor is moderate; and the farm lands are near to the packing plants at the ocean ports. Hog cholera is common, but methods of treatment are well understood. The exportation of pork products has risen notably of late, and all indications point to a constant increase in this trade. Hogs can be raised more cheaply in Argentina than in the United States, and pork products from Argentina can be delivered to the eastern United States as cheaply as from Iowa or Illinois. The

time is not many decades away when both Argentine beef and pork will be coming in quantities to the United States unless they are excluded by a tariff wall.

More Goats Than Swine.—In Argentina, there are nearly 5 million goats; they are most numerous in the arid west and northwest where the scrubby pasture and rocky land make sheep raising unprofitable. Moreover, the Italian and Spanish immigrants, who are numerous in Argentina, come from lands where the goat is a respected member of animal society, and they do not regard the goat as a joke. As a result of dry climate, rough land and racial attitude, goats are more in favor in Argentina than hogs are, and there are more of them. But this numerical superiority is not likely to persist.

The Rise and Decline of Sheep Raising.—Argentina has long been one of the foremost sheep-raising countries of the world, ranking at present next to Australia and slightly ahead of the United States. In the years around 1895, Argentina had approximately 75 million sheep, but by 1925, the number had declined to 30 million. On alfalfa pastures, cattle are more profitable than sheep, but sheep are better adapted to the thin pastures of dry or rocky lands, because sheep can get a living where cattle would starve. The increase of alfalfa pastures and of plowed land has pushed the sheep more and more into the inferior lands of the west and of Patagonia. However, Buenos Aires still has more sheep than any other province, as it has more of nearly everything else.

In central Argentina, within convenient distance of the meat-chilling and meat-freezing plants, sheep are raised both for mutton and for wool; cross-breeds are the rule. Eastern Argentina has moist lands, and upon them the Lincolns, originally bred on the moist lands of England, predominate. This breed is a

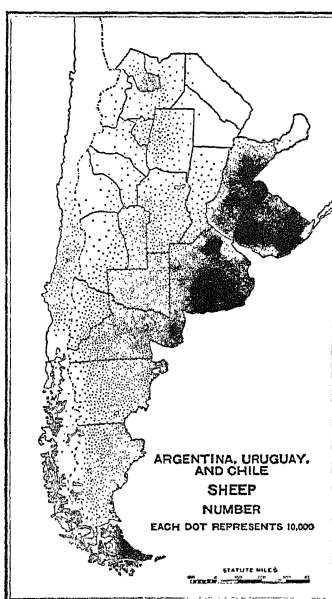


FIG. 106.—(U. S. Dept. of Agr.)

mutton producer and is, therefore, preferred by the ranchmen whose lands are within easy reach of the packing plants at the ports of the Río de la Plata and the Paraná. On the scant pastures of the west and south, merino sheep, large wool producers, originally bred on the dry lands of Spain, predominate. In the southern part of Patagonia, where the climate is cooler and the precipitation somewhat greater, cross-breeds are raised mainly for their wool; but in Tierra del Fuego where mutton-freezing plants have been built, sheep are also raised for mutton.

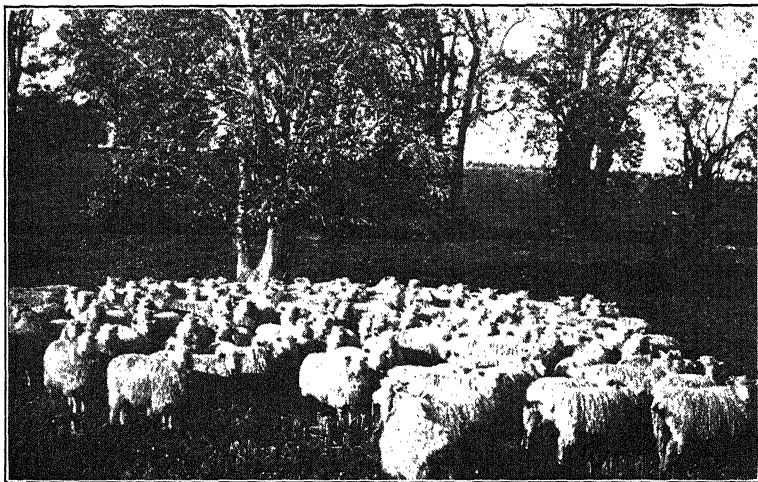


FIG. 107.—Sheep in the thin forest of west central Argentina. The number of sheep in Argentina is declining as beef cattle and agriculture increase. (*Photo by H. G. Olds.*)

PATAGONIA AND ITS SHEEP

After the adjustment of the boundary between Chile and Argentina in 1902, Patagonia became definitely a part of the latter country. It is one of the least attractive regions of the republic. Lying between latitudes 40° and 55° S., it has bitterly cold winters in the south and disagreeable ones everywhere. Excepting in the mountains, little rain falls, and the stony land has a scanty covering of bunch grass and scrub. Flows of lava, still quite fresh, extend across the country. Dry cañons, and the gorge-like valleys of intermittent streams cut through the steppe; and occasional rivers, heading in the Andes, flow to the Atlantic. Snow covers most of Patagonia in winter, and violent winds are

common at all seasons. In the north, one railway extends from the coast part way to the Andes, but it has relatively little traffic. Scarcely anywhere can cultivated crops be grown without artificial irrigation, and only a little of this has yet been attempted, though large enterprises are under consideration, especially along the Rio Negro and the Rio Chubut. Most of the land that offers pasturage for sheep is now used for that purpose, and sheep raising is the one distinctive occupation of the country. Ranches covering hundreds of thousands of acres have been acquired, and Scotch, Welsh, and English owners are common. Many of these came from the sheep-raising Falkland Islands (British) nearby.

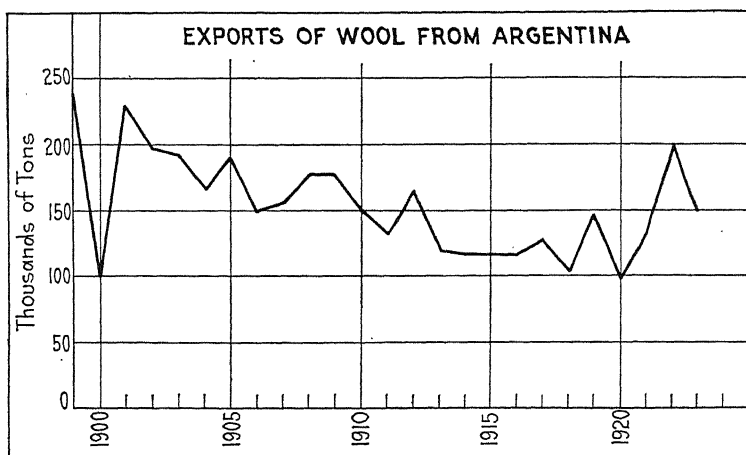


FIG. 108.—Argentina ranks second only to Australia in wool production.

So thin is the pasturage that ten times as much land must be allowed for each animal as is necessary on the Pampa. Yet there are upwards of 10 million sheep in Patagonia, and only about 100,000 people—100 sheep to each person. Ranch houses are many miles apart, and a family may not see a neighbor family for weeks at a time. The wool is hauled long distances to a shipping point. Aside from sheep raising, there is little other use to which this bleak Patagonian steppe can be put, and it would seem that the region, like large parts of the arid West of the United States, holds little promise beyond this.

Argentina a Leading Exporter of Wool.—Argentina is second only to Australia as an exporter of wool, and practically all of it is of good quality, known as clothing or combing wool, as

distinguished from coarse carpet wools. Although the number of sheep in Argentina has declined more than 50 per cent from the high point, yet the production of wool has not declined so much, because the improvement in the breeds of sheep has increased the weight of the fleeces. More than 500 million pounds of wool have been exported in a single year, but the average since 1900 has been about 300 million pounds a year, or 16 per cent of the export wool of the world. Formerly, Argentine wool went mainly to Europe, but more recently very large quantities have come to the United States, although Great Britain, France, and Germany are usually larger purchasers than the United States. Among the exports of Argentina, wool ranks as one of the leaders in value, but is likely to decline slowly as the better land is put to more profitable uses.

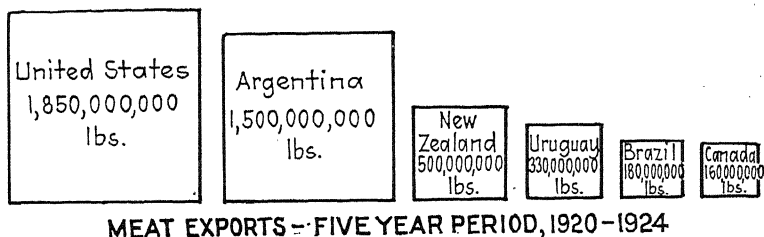


FIG. 109.—Average annual exports of meat by leading exporting countries 1920-1924. In the exportation of beef alone, Argentina leads.

THE MEAT TRADE

Meat Packing and the Export Trade in Animal Products.—The first meat regularly exported from Argentina was jerked beef. At one time, the *saladeros*, or factories in which this product was prepared, were much more important than they are now. The first refrigerator ship docked at Buenos Aires in 1876 and initiated the shipment of frozen meat, chiefly mutton. By 1889, a million carcasses of frozen mutton were being exported yearly. During this period, live cattle were being shipped to Europe to be slaughtered there. Later, the freezing plants prepared and shipped frozen beef as well as mutton; but not until 1901 did the shipping of chilled beef in quantities begin. It costs more to transport chilled meat than it does frozen meat, but the chilled beef sells in London for about 2 cents a pound more than frozen beef. The building of huge modern meat-packing plants by

the Chicago packing companies (Swift, Armour, Morris, Wilson) and by English companies has greatly changed the meat trade of Argentina. Now the highest quality of chilled meats is sent out by these great establishments located at Buenos Aires, La Plata, Zarate, and at Montevideo in Uruguay. Frozen beef is still shipped in large quantities, but chilled beef has taken the lead. Mutton is still shipped frozen, for it is practically as good as the chilled product. The annual shipments of fresh and preserved meats has passed the enormous quantity of $1\frac{1}{2}$ billion pounds. Besides, 200 million pounds of tallow, and 200,-

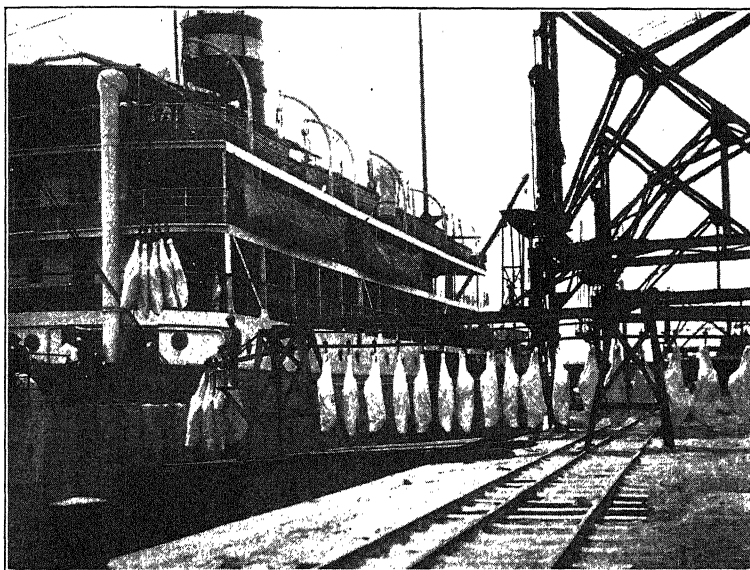


FIG. 110.—Loading a cargo of chilled meat at one of the large American packing plants at La Plata, Argentina.

000 tons of hides and skins are exported in an active year. There are ten meat freezing plants in the province of Buenos Aires, and five smaller ones in Patagonia and Tierra del Fuego, the latter devoted to freezing mutton. The great meat-packing companies are almost wholly controlled by American and English capital and work more or less in harmony, somewhat as the big packers do in the United States. This has caused a hostile attitude on the part of the Argentine stock raisers and of the meat-consuming public, and drastic laws have been aimed at these foreign

corporations. There has been much agitation for a national packing plant operated by the government. Such an experiment is not unlikely, though it probably would not succeed. The exportation of animal products—meat, wool, hides, and dairy products—is of tremendous importance to the economic prosperity of Argentina. From 1914 to 1920, these products formed 49 per cent in value of the exports of the country, while agricultural products formed only 46½ per cent. In subsequent years, agricultural exports exceeded animal exports, as they are likely to continue to do.



FIG. 111.—Meat exports from Argentina 1915–1924.

Summary of Live-stock Industries.—The raising of live stock is a form of industry peculiarly suited to Argentina because of the mild winters, vast grassy plains, large land holdings, luxuriant growth of alfalfa, shortage of agricultural labor, and high social standing that the wealthy estancieros enjoys. The remarkable success of alfalfa is the greatest present stimulus to cattle raising. Cattle and horses are increasing. Sheep, which are being forced into the poorer lands, are decreasing. Swine are increasing but are not yet raised in large numbers. Dairying is making prog-

ress, and dairy products are rising in the list of Argentine exports. Huge modern meat-packing plants have been built at the ports. By means of imported animals, the live stock has been raised to conspicuous excellence. Animal diseases are more prevalent than in the colder climate of Europe and the United States but are reasonably well under control. Animal products supply from 35 to 40 per cent of the exports of Argentina, a very high percentage. Argentine exports of animal products go more largely to Europe than to the United States; yet great quantities of wool and hides come to this country. Argentine meat can pay the United States tariff and still compete with native beef in our eastern cities. Stock raising in Argentina is not likely to increase very much more, for agricultural crops bring a larger return per acre and will gradually displace pastures as population increases.

(For references, see end of Chap. XII.)

CHAPTER XI

THE ARGENTINE PAMPA AND THE ARID WEST

AGRICULTURE ON THE PAMPA

Actual and Potential Use of the Land.—Up to 1915, 60 million acres in Argentina had been brought under cultivation. This acreage, constituting 8 per cent of the total land, did not increase for the next 10 years. The cultivated land is devoted chiefly to alfalfa, cereals, and flax and the total area under cultivation is equal to the cultivated land in Ohio, Indiana, Illinois, Wisconsin, and Michigan. However, the area plowed in any one year in Argentina is only 30 to 35 million acres. About one-fourth of the land suited to tillage is cultivated. It is believed that 82 per cent of the land of the republic is capable of some economic use—crops, pasturage, or forests. The following table shows approximately the proportion of land of different categories:

Agricultural land.....	350,000 square miles	30 per cent
Good or fair pasture.....	250,000 square miles	22 per cent
Valuable forests ¹	200,000 square miles	18 per cent
Thin pasture and scrub.....	150,000 square miles	12 per cent
Waste land.....	200,000 square miles	18 per cent

An idea of the agricultural possibilities of Argentina may be formed by comparison with Germany. Before the World War, that country was able to raise the food for about 50 million people on 100,000 square miles of agricultural land and 50,000 square miles of pasture land. Argentina has more than three times as much agricultural land and good pasture land as Germany had in 1914, and the soil and climate are better. Agricultural methods in Argentina are far behind those of Germany, but Argentina could feed 150 million people if its land were used as the German land is used. It is a still more impressive fact that Japan is raising most of the food for 50 million people on one-quarter of the land that is cultivated in Argentina.

¹ Some official estimates class 36 per cent of the area of the country as forest land, but fully half of this contains little or no valuable timber.

Much Argentine land is fertile, very fertile, and the climate of the Pampa is genial; but the agricultural methods are wasteful, as they are in most young countries. The yields of grain per acre average lower than they do in the United States, and from one-third to one-half as large as in France and Germany. This is due mainly to tenant farming. There is a shortage of farm labor. Land has been abundant and cheap, and intensive cultivation has been out of the question. The immigrant tenants

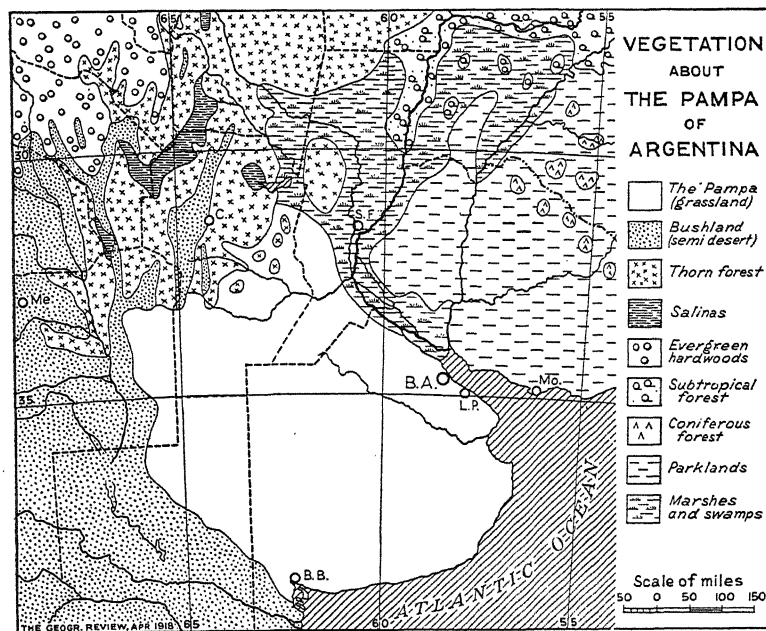


FIG. 112.—Vegetation of the lower River Plate lands. (Map by W. S. Tower. Courtesy of the *Geographical Review*, published by the American Geographical Society of New York.)

have little knowledge of large-scale farming. Rainfall varies greatly from year to year and so do the crops. Twice as much wheat was raised in 1916 as in 1917 on the same acreage. While not ranking with the United States, Canada, or Russia, Argentina is one of the great potential food producers of the world.

Large Land Holdings.—One of the chief differences between the development of agriculture in the United States and in South America is in the size of land holdings. In the United States, the plantation system, with its large holdings worked by

slave labor, prevailed only in the South; but the system there has steadily changed since 1865 in the direction of smaller holdings. In the North, small farms always were the rule. The northern farmer with his family and hired man worked the farm, and the owners of the land were the hardest-working class in the community. Our national homestead laws distributed public land in small tracts to actual farmers, and the average size of farms in the United States has long been about 150 acres. Thus, there grew up a rural society of industrious land holders who were fond of rural life, built comfortable homes and good farm buildings, provided schools and churches, organized rural societies, gradually built good roads, installed telephones, acquired automobiles, and formed one of the most substantial and respected groups in the life of the nation.

Throughout Latin America, on the contrary, most of the land passed into the ownership of a landed aristocracy that has held it in great estates. In Argentina, there are thousands of *estancias* of large size. Many of these date from 1878 when the Indians were finally driven from the Pampa; the land thus made available was given for services in the Indian wars or was sold for \$400 a square league of 6,175 acres, or less than 7 cents an acre. At that time, 25 million acres were disposed of in huge blocks, and these now form some of the largest *estancias* of Argentina. Land holdings reach 100,000 to 500,000 acres in extent. A few are even larger, and where several members of a family combine their holdings, the total may reach a million acres. In the provinces of Santa Fé and Cordoba, there are about 400 holdings of 10,000 acres or larger. At one time, 30 per cent of the best land of the Province of Buenos Aires was held by 93 proprietors.

In the main, the great *estancias* are devoted to stock raising, especially to cattle. One *estancia* of 240 square miles had at one time 62,000 cattle, 87,000 sheep, and 4,200 horses. Another of 244 square miles had 42,000 acres of alfalfa and approximately 100,000 cattle, 100,000 sheep, and 10,000 horses. The wealthy Argentine families are proud of their estates and derive large profits from them. The owners do not necessarily live on the estates. Rural life in most parts of Argentina is unattractive; city life is preferred, and most of the wealthy *estancieros* have homes in Buenos Aires. Often these are palatial, and the occupants spend like princes.

Such enormous land holdings operated by employees and tenants result in an inefficient use of the land. The owner is usually reluctant to part with his holdings, and this makes it difficult for the immigrant to get land at a price that he can pay. On the great estancias, the crops are commonly grown by share workers. It is estimated that 80 per cent of the grain is so raised. In certain sections, notably in Santa Fé where smaller farms cultivated by the owners prevail, comfortable farm homes are the rule. The government is trying to promote the subdivision of the great estates and to parcel out the remaining public land in small farms. Between 1901 and 1917, the number of estates of 25,000 acres or larger in the Province of Buenos Aires decreased from 486 to 328. In 1924, it was estimated that 25 to 30 per cent of the operators of farms were owners, and most of these were small farmers.

Land Values.—Wherever productive land lies within a short distance of a railroad station, it has risen greatly in value, and fortunes have been made from this source. Many factors enter into the market value of land, and *average* values do not mean much. The advance in land values between 1901 and 1918 indicates a rise of approximately 350 per cent, but after 1920, a postwar recession in prices took place. Actual sales reported in a Buenos Aires newspaper in April, 1924, show something of the range of values. The areas have been converted into acres and the selling prices into United States money, giving the paper peso its par value of 43 cents.

4,100 acres in Mendoza.....	at	\$ 1.75 per acre
50,000 acres in Pampa Central.....	at	6.50 per acre
2,000 acres in Buenos Aires.....	at	26.00 per acre
1,700 acres in Buenos Aires.....	at	33.00 per acre
5,200 acres in Cordoba.....	at	35.00 per acre
6,200 acres in Buenos Aires.....	at	85.00 per acre
6,700 acres in Buenos Aires.....	at	124.00 per acre

These values do not represent either the highest or lowest. In Argentina, as in the United States, land values rose feverishly during the World War and collapsed afterward.

The Agricultural Colonists and the Progress of Agriculture.—Modern agriculture was slow in gaining a start in Argentina, largely because stock raising was established and profitable. The old families have never taken kindly to agriculture. The newcomers, especially those from northern Italy, have turned the sod

of the Pampa and have made Argentina an agricultural as well as a pastoral country; and they have done it against heavy odds. These immigrants were poor; they had little but their own industry to offer. The first of the agricultural colonies were established in the Province of Santa Fé in 1854. They rented land or acquired it by one form of purchase or another and, by their arduous labor and thrift, transformed much of the Province of Santa Fé from cattle and sheep pastures into corn, wheat, alfalfa, and flax fields. They prospered, and today a high proportion of the land of Santa Fé is owned in moderate-sized farms by these energetic colonists or their sons.

As the remarkable success of alfalfa in Argentina became assured, the estancieros sought to get more of their pasture land into this crop. It is done by plowing the land and sowing corn,

Alfalfa-19.7	Wheat - 16.25	Corn 7.75	Flax - 4.25	Oats - 2.25	All Others - 7.0
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ACREAGE OF LEADING CROPS IN ARGENTINA

MILLIONS OF ACRES, 1922-1923

FIG. 113.—Two crops occupy nearly two-thirds of the cultivated land of Argentina.

flax, wheat, or other crops 2 or 3 years, and then sowing alfalfa, which will continue to grow for 5, 10, or 15 years. In some cases, the owner of the estancia turned farmer and did this himself, but in the majority of cases, he spurned this sort of occupation and rented tracts of land of 200 to 600 acres to immigrants either for cash to be paid when the crops were marketed, or for a share of the produce. Share tenants are the more common. An estancia may set off many such tracts of land to be cultivated 2, 3, or 4 years by colonists who finally leave the tracts sowed to alfalfa and move on to similar undertakings on other estancias. Having only a short-lived interest in the land that he cultivates, the tenant does not and cannot build a good home. A mud or sod hut must answer. He develops little or no community interest and cares little about schools or roads, for which he will have little use. He lacks capital and knowledge, and has no social standing. Yet, by this system, the cultivated land of Argentina

has been increased from $1\frac{1}{2}$ million acres in 1872 to 60 million in 1915, and Argentina has become one of the great surplus-food producers of the world. But the European immigrant has done most of it. In thousands of cases, the immigrants have become land owners, and a few have become wealthy. Yet the burning question in Argentina is still the land question. There are still many great estates, and many landless and dissatisfied tenant farmers moving from place to place. There are too few substantial, home-loving farmers of the middle class.

Writing nearly two decades ago, two Argentine authors said:

"The great obstacle in the way of the agricultural development of the Argentine arises essentially from the faulty property system; from the fact that enormous tracts of land are held by a few men, from the establishment, in short, of the most odious system of latifundia ever known. This trouble arises from the lack of foresight with which the state has parted with enormous tracts of land, which have passed into the hands of speculators or large land owners, who have left them untouched while waiting for the value of their holdings to rise."¹

Wheat, the Chief Cereal.—More than a quarter of the cultivated land of Argentina is devoted to wheat; only alfalfa exceeds it in acreage. More or less wheat is raised throughout the Pampa, except in the extreme east where the water-soaked land is not suited to cultivation. The provinces of Cordoba, Santa Fé, western Buenos Aires, and eastern La Pampa constitute the wheat belt (Fig. 114). The influence of rainfall is clearly seen in the location of this belt; for wheat, here as in the United States, has gradually moved westward into the drier lands, for it can thrive on less water than some of the other cereals.

Argentina, like western Canada, western United States, and Australia, is a new country, with wide areas of level land upon

¹ MARTINEZ and LEWANDOWSKI. *The Argentine in the Twentieth Century*, p. 129.



FIG. 114.—The principal wheat lands form a crescent on the western and southern sides of the Pampa. (*U. S. Dept. of Agr.*)

which modern farm machinery can be employed. Wheat is a crop with a world market. It keeps well, ships well, and usually brings a price that renders the crop profitable in Argentina even under unscientific methods of production. It is the world's greatest export cereal, and Argentina is one of the four leading

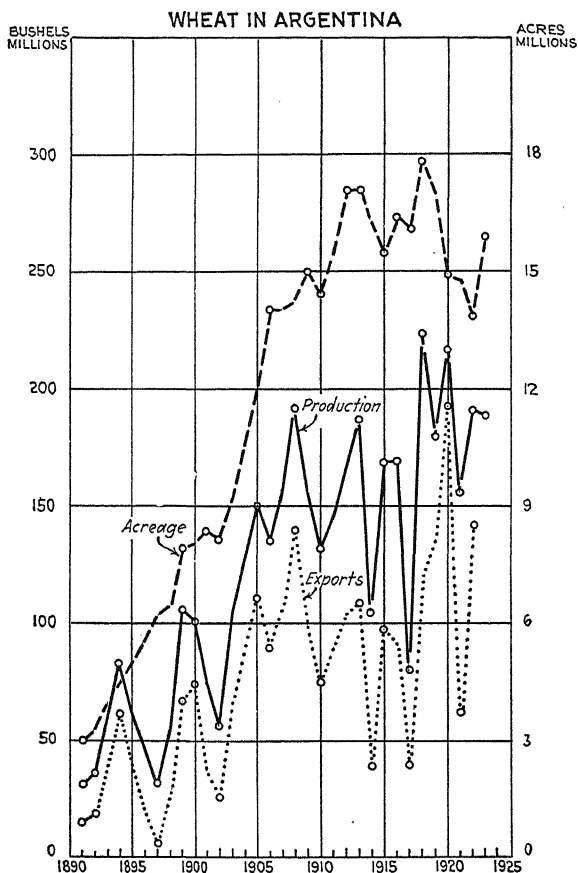


FIG. 115.—Acreage, production and export of wheat, Argentina.

exporters. The Argentine crop fluctuates widely with good and bad seasons as shown by Figure 115. The acreage sowed to wheat rose 500 per cent between 1890 and 1918, and the production has reached above 200 million bushels, of which 60 to 70 per cent was exported. As previously mentioned, the yield of wheat per acre is rather low, usually averaging about 12 bushels as against 17

ECONOMIC GEOGRAPHY
OF
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in Canada. In the United States, the average yield per acre rose from 12 bushels in 1875 to 15 bushels in 1915, at which figure it remains.

The average annual production of wheat in the United States for the past 20 years has been about 700 million bushels, with the high yield reaching 1 billion bushels. In Argentina, the average

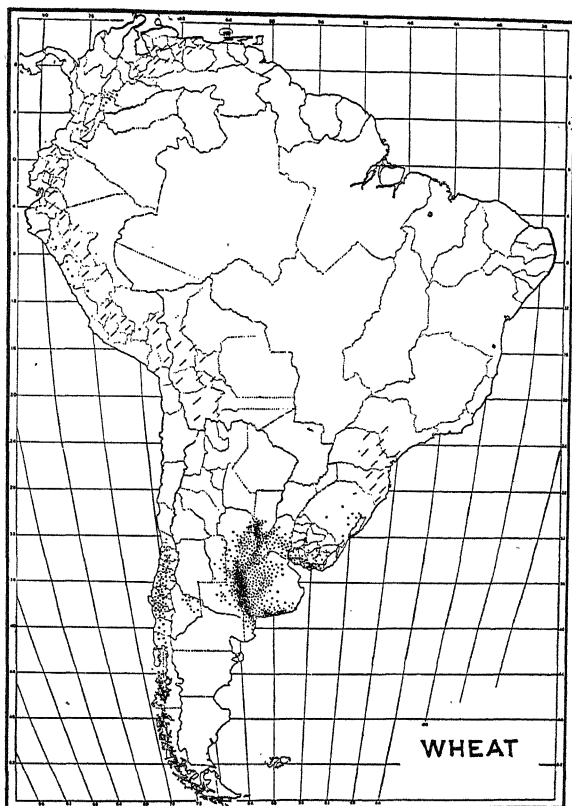


FIG. 116.—Each dot represents 20,000 acres of wheat. (Map by Pan-Am. Union).

has been about 150 million bushels, and the high point 220 million bushels. The United States, however, exports scarcely 20 per cent of the wheat which it raises, while Argentina exports over 60 per cent. A part of the Argentine wheat is raised on land that is being prepared for alfalfa and, therefore, is not a permanent crop on that land. It happens that the region where alfalfa grows best is also the principal wheat region.

WHEAT EXPORTS OF THREE LEADING EXPORTING COUNTRIES
(In thousands of bushels)

	8-year average, 1901-1909	5-year average, 1909-1914	7-year average, 1914-1920	3-year average, 1921-1923
Argentina.....	83,027	95,242	75,097	125,600
Canada.....	37,546	90,870	147,523	206,800
United States.....	151,890	100,310	239,849	289,100

PRODUCTION AND EXPORT OF ARGENTINE WHEAT

	5-year average, 1910-1914	4-year average, 1920-1923
Production.....	149,000,000 bushels	199,000,000 bushels
Export.....	90,000,000 bushels	125,600,000 bushels
Per cent exported.....	61	63

Harvesting and Marketing Wheat.—Because of the level land and large farms, modern harvesting machinery of large size is widely used. The wheat is taken directly from the field to the thresher. The grain is immediately run into jute bags which are piled in great heaps in the open air and are covered with waterproof canvas (Fig. 118). Later, the bags of wheat are loaded upon immense wagons or carts drawn by several teams of horses and hauled to the railway station where it is again piled in heaps in the open or in sheds, if such are available. The hauling is often done by a class of teamsters who make this a business. There are practically no country elevators in Argentina, and grain must be shipped in sacks. The cost of sacks reaches 15 to 18 million dollars a year for the country as a whole. Since the terminal elevators at the ports are inadequate for storing the wheat that is to be exported, some of the grain must remain for months under the imperfect storage conditions already mentioned, and losses by damage are inevitable.

Distances from farm to port in Argentina average scarcely one-fourth those in the United States or Canada, but railway rates in Argentina are high, and the country roads are poor. All things considered, the Argentine wheat grower does not receive a much larger net price for his wheat than does his competitor in North America, although in a good year, it is somewhat larger. Much of the Argentine wheat is ground into flour before being exported. Brazil and Great Britain are the leading buyers. Wheat, including flour, forms one of the foremost exports.

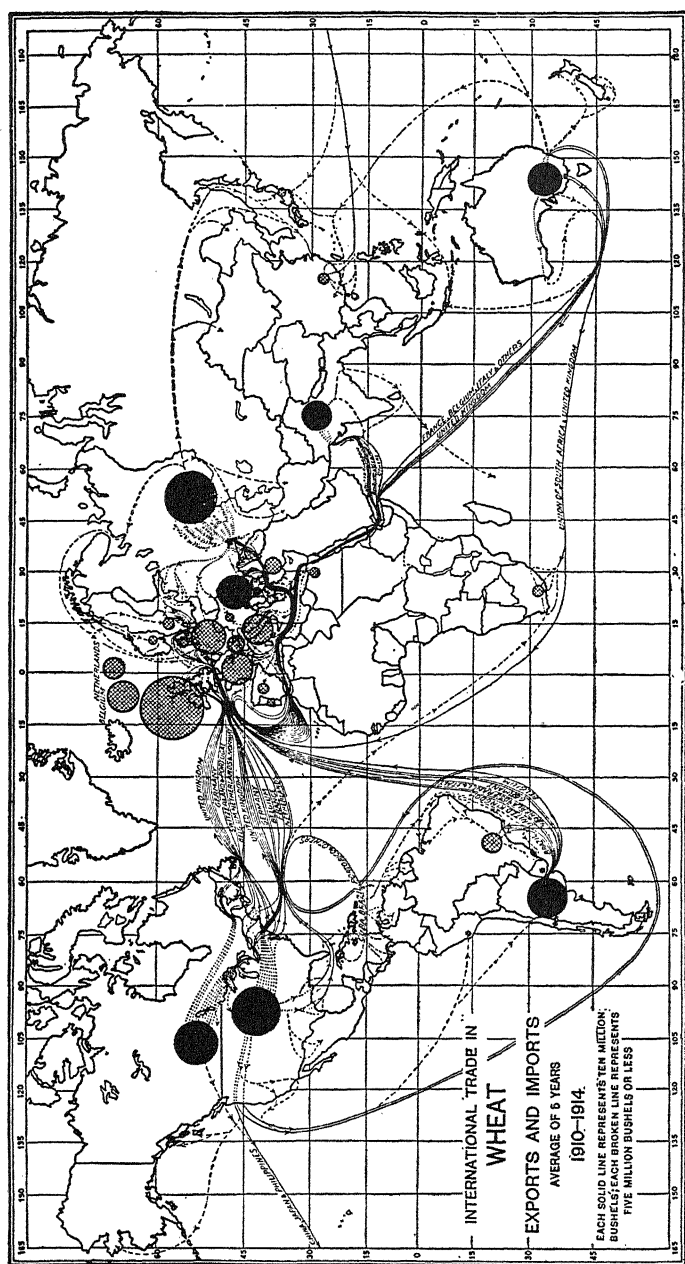


Fig. 117.—Regions of exportation and importation of wheat, and trade routes. (1921 Year Book, U. S. Dept. of Agr.)

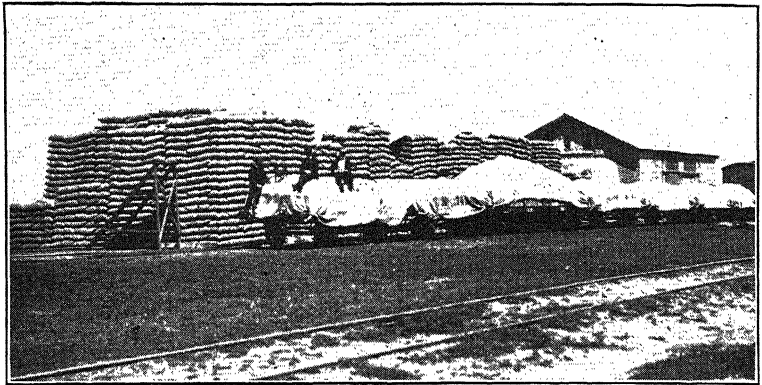


FIG. 118.—Piles of bags of wheat at a railway station in Argentina. Since there are practically no country elevators in Argentina, grain is handled in bags. (Photo by H. G. Olds.)

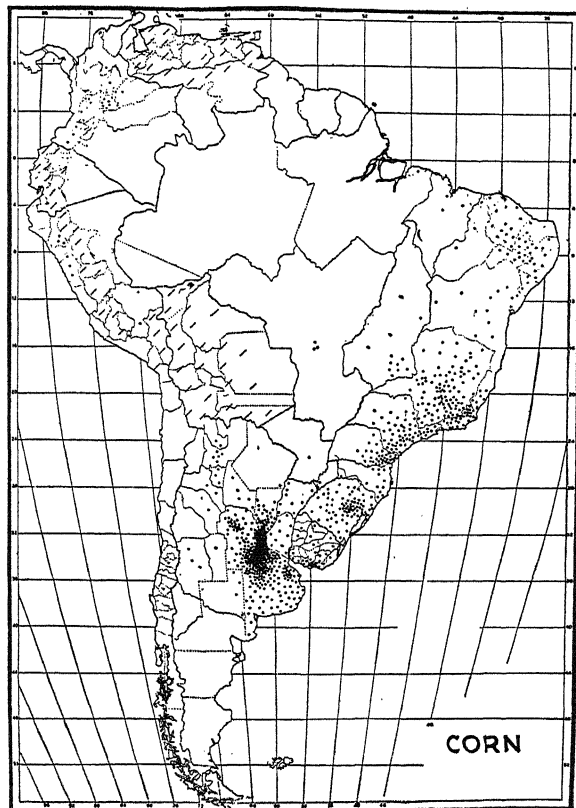


FIG. 119.—Each dot represents 20,000 acres of corn. (Map by Pan-Am. Union.)

Argentina, the Leading Exporter of Corn (Maize).—Argentina produces only one-tenth as much corn as the United States, but it exports more. In the United States, nearly all of the corn is fed to hogs and cattle. In Argentina, relatively few hogs are raised, and cattle are fattened on alfalfa. Hence, the greater

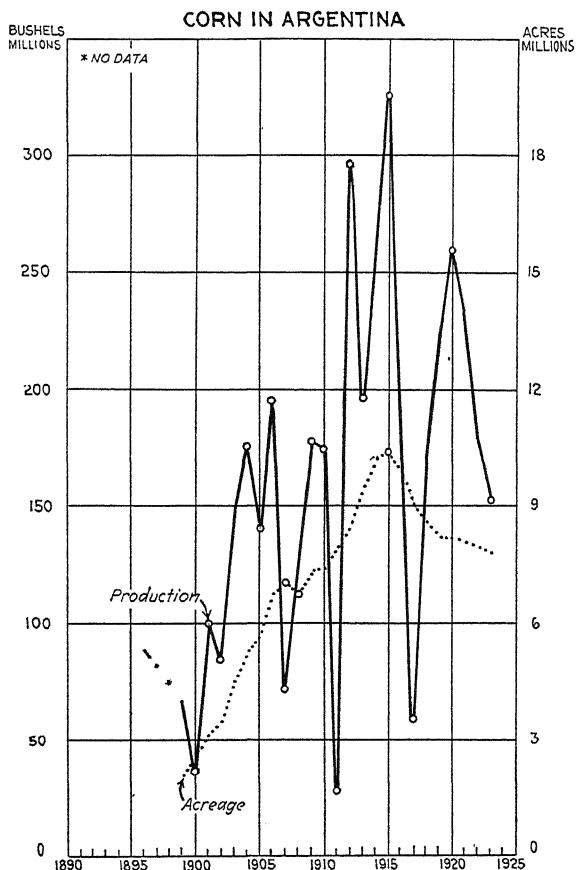


FIG. 120.—The great fluctuation of corn production in Argentina is largely due to fluctuations of rainfall. The acreage decreased after 1915, partly on account of the increased acreage of alfalfa.

part of the Argentine corn is available for export, and the annual shipments abroad have reached nearly 200 million bushels, but the postwar shipments were only about 60 per cent of that quantity. In fact, the acreage planted to corn declined after 1915 (Fig. 120).

The corn belt is rather small and is surrounded on three sides by the great crescent of the wheat belt (Fig. 121). The concentration of corn raising is most notable in the Province of Santa Fé, but extends into Cordoba and Buenos Aires. Traveling on the railroad between the cities of Buenos Aires and Rosario, one passes through miles and miles of nearly continuous corn fields. The flint variety is the one most commonly grown. The ears are snapped from the standing stalks in the field and are stored temporarily in great cylindrical heaps (*trojes*) inclosed in wire



FIG. 121.—(U. S. Dept. of Agr.)



FIG. 122.—(U. S. Dept. of Agr.)

netting and corn stalks, and thatched with corn stalks. Commonly, the harvesting of corn is done by special contract workers who go from farm to farm. Owing to the imperfect protection given to the harvested crop, some of the corn may be damaged or spoiled during the period of storage. In both acreage and production, corn stands next in rank to wheat among the cereals of Argentina. The annual yield is extremely variable on account of locusts and drought, which at times inflict great damage upon the growing crop.

Argentina, the Leading Producer of Flax Seed.—In certain countries (Russia, for example), flax is raised mainly for the

fiber. In Argentina, it is grown almost wholly for the seed and is used for the manufacture of linseed oil employed in painting. The four leading flax-growing regions are (1) India, (2) Argentina, (3) Russia, (4) United States and Canada. Argentina produces fully one-quarter of the world's flax seed, while Russia formerly produced 60 per cent of the fiber. As a crop, flax makes heavy demands upon the fertility of the soil but resists drought and endures extremely hot and variable weather. Flax growing on a large scale is relatively recent in Argentina. The production rose from 9 million bushels in 1900 to 60 million bushels in 1921 (Fig. 123). The crop is grown mainly in Santa Fé, but to a

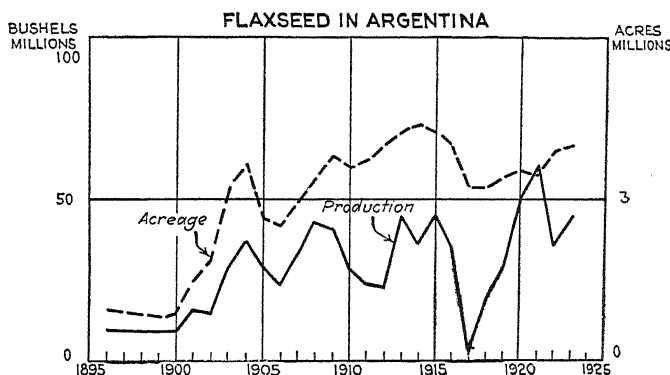


FIG. 123.

smaller extent also in the adjacent provinces. Nearly all of the crop is exported, and the United States is the leading buyer.

Cereals of Minor Importance.—Argentina raises almost no rye, relatively little barley, and only one-third as many bushels of oats as of corn. Oats and barley are both exported in relatively small quantities.

ADVERSE AGRICULTURAL CONDITIONS

Drought.—Occasional droughts are an adverse climatic factor. The Pampa, like the eastern half of the United States, has the cyclonic type of winter climate and the thunder-storm type of summer climate. Ordinarily, the rainfall is fairly well distributed through the year, with a little more than half of the precipitation coming in the summer (November to March). When the full average rainfall is received, the crops and pastures are

excellent; but every few years, droughts visit a part of the agricultural section and bring heavy losses to the farmers.

For example in October, 1866, 9 inches of rain fell in Buenos Aires, but in the same month of the following year, only $\frac{1}{4}$ inch fell. In September, 1884, 13 inches fell, and in September, 1885, only 1 inch. In 1893, Buenos Aires received about 20 inches of rainfall, but in 1900, it received as much as that in the single month of March. There are periods of 5 to 8 years without a ruinous drought on the Pampa; then again, as in the 9 years from 1914 to 1922, there may be several years of deficient rainfall. Herein lies the most serious handicap to agriculture in this land otherwise so favored. The wealthy estate owners are able to average the good years with the bad and derive a profit from their land, often a generous profit; but the tenant who has no reserve capital may find himself worse off at the end of a season than he was at the beginning. A hard year's work and his small capital are swallowed up. Fortunately, the more serious droughts are not frequent.

The Locust Pest.—One of the worst agricultural pests in Argentina is the locust, which visits the northern half of the country and does heavy damage to green crops. In the spring, these creatures fly south in clouds from the Chaco and settle in the northern agricultural provinces. Here, the females deposit their eggs, and about 3 weeks later, the young hatch. In the first five of the six stages through which they pass in their metamorphosis, they are crawlers and hoppers. In the sixth stage, they take on wings and fly away in a northerly direction, probably back to the Chaco. In the hopping stage, they travel over the country in countless millions and eat nearly every green thing they reach, covering belts 50 miles or more in width. So destructive are they that a special government organization for combating them has been established; 900 to 1,000 persons are permanently employed, and about 1,000 additional at times of special need. Ten million pesos a year have been appropriated to fight the locust.¹ Sprays, barriers, traps, and burning are all resorted to, but with very little effect. The number of locusts is so inconceivably great that the thousands of tons of them that are

¹ In 1925, a United States steel company shipped 15 million galvanized iron sheets to Argentina to be used in building barriers to protect crops from locusts. These 15 million sheets would build a barrier 14,000 miles long.

destroyed make little impression. They do not come every year and are much worse in some years than in others. In a bad year, the locusts may reduce certain crops by 10 to 25 per cent, and in an especially dry year, the drought and locusts may reduce crops by as much as two-thirds.¹

THE ARID AND SEMI-ARID WEST

The Mountainous Belt.—About one-fourth of the area of Argentina is comprised in the ranges and spurs of the Andes. Scarcely anywhere is this belt of mountains and foothills less than 100 miles wide, while in the north it is much wider (Fig. 92). Lying on the leeward side of the Andes and partly in the dry horse latitudes it is a region of little rainfall, and large sections are desert or near-desert. Streams descending from the Andes flow a short distance eastward, lose themselves in the sand, or die out in swampy lagoons. For a stretch of nearly 1,000 miles from the Rio Salado in the north to the Rio Colorado on the boundary of Patagonia, no river rising in the Andes flows entirely across the plains to the sea.

In a few favored places, irrigation is practiced (p. 258), notably in the vineyards of Mendoza and the sugar lands of Tucumán, both of them having been among the earliest settlements in Argentina. They were settled, however, by people who came into Argentina from Chile and Peru, not from the eastern ports. In the eastern portion of these mountains are several old historic cities. In addition to Mendoza and Tucumán already mentioned, there are Salta, Catamarca, Jujuy, and San Juan. On the eastern border of the Sierra de Cordoba is Cordoba, the third city of the republic in size. All of these are venerable cities whose early growth was due to trade, especially the cattle trade, with the mining centers of the Andes. The driving of cattle from the Argentine pastures over the high passes of the Andes to the mining camps of Chile still continues. The mountainous belt continues southward to the very tip of the continent at Cape Horn. In the southern or Patagonian section, the Andes receive considerable precipitation on the eastern slopes, and this gives rise to forests and pastures and has created a cattle-raising industry of local importance. The glaciers, glacial lakes, and forest-clad mountains of this region,

¹ An excellent account of a locust invasion is found in chap. 7, pp. 118-135 of WALTER LARDIN'S book, *Argentine Plains and Andine Glaciers*, 1911.

both on the Argentine side and on the Chilean side, have led to the name "the Switzerland of the southern Andes."

IRRIGATION

Location and Extent of Irrigated Lands.—More than half the land of Argentina receives too little rainfall for the cultivation of crops without irrigation. Moreover, only a very small part of this arid land can be irrigated, because water cannot be obtained.

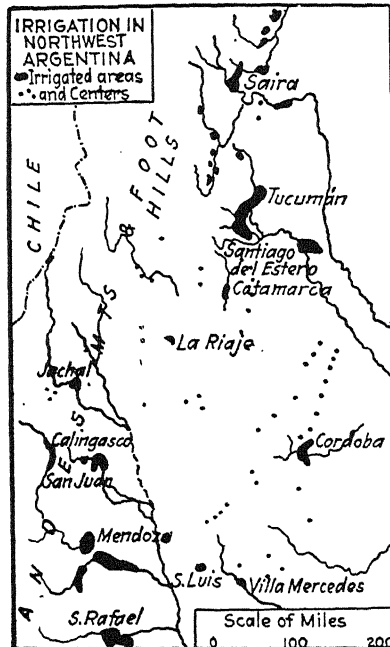


FIG. 124.—In western Argentina crops can be raised only where irrigation is possible. (After Denis.)

The irrigation works are of various sorts: (1) In several of the arid provinces lying at the base of the Andes and in the northern half of the country are small scattered areas that are irrigated from mountain streams (Fig. 124). Here individual farmers divert water from the rivers and irrigate such land as they can. The total area thus served is relatively small. (2) In a few places—notably in Mendoza and Tucumán—the mountain streams are large enough and numerous enough to supply water for larger areas. About a million acres are irrigated in Mendoza

and a smaller number in Tucumán. Most of this irrigation is due to the initiative of the cultivators themselves and was carried on in a small way even in the colonial period. (3) In certain places, the government has assisted in financing large irrigation projects or has carried out the entire project, as in the valley of Rio Neuquen. Such projects have proved very costly, and not all of them are financially successful because of the heavy water charges against the irrigated land. The total area of irrigated land in Argentina is about 2 million acres, or about 8 per cent as much land as is under irrigation in the western part of the United States.

The Mendoza and San Juan Vineyards and the Wine Industry.—The largest area of irrigated land in any province of Argentina is found in Mendoza, at the base of the Andes, where the range is crossed by the Transandine Railway. Near the fine city of Mendoza, surrounded by the desert, is the principal vineyard region of Argentina. Here a half-dozen streams, heading in the mountains, flow out upon alluvial fans and supply water to the irrigation canals and ditches. Storage reservoirs of large capacity are not used (Fig. 86).

Like all of the Latin peoples, the Argentines use wine; but it should be said in passing, they are moderate drinkers, and drunkenness is unusual among them. Mendoza produces 75 per cent of the wine made in Argentina. In an average year, this amounts to over 100 million gallons. Some of the wine-making establishments are of great size, and single ones represent an investment of hundreds of thousands and even millions of dollars. The annual wine output of Mendoza province reaches 40 million dollars; one acre of good vineyard will yield 600 gallons. Since the wine has to be stored for years to perfect its quality, enormous storage cellars and a large amount of capital are required. The Province of San Juan, lying immediately north of Mendoza, produces about 20 per cent of the wine made in the country. Thus do these two irrigated provinces in the California of Argentina supply 95 per cent of the native wines. Before the World War, Argentina imported considerable quantities of wine, especially from France. In postwar years, this importation was only about one-eighth as much, while exportation had more than offset the importation. However, the acreage devoted to vineyards and the quantity of wine produced has not increased in recent years.

The Cane Sugar of Tucumán and Lesser Provinces.—As a rule, Argentina raises enough cane sugar to supply her own people, and 85 per cent of this is grown in the northerly province of Tucumán, near the old city of the same name. It is a little province, the smallest in Argentina, and is in the arid belt. Irrigation is required for the crops, but these are neither numerous nor extensive in this region. In the neighboring provinces of Jujuy and Salta, smaller quantities of sugar cane are also grown. The sugar planters are subject to two handicaps—droughts and occasional frosts. Weather conditions cause a wide variation in the annual production. For example, in 1914 the yield was 740 million pounds, and in 1916, it was only 185 million pounds, or one-fourth as much. This uncertainty as to annual yield is a serious difficulty and limits the financial success of the industry. The cane is grown both on large plantations which operate their own mills and on small ones which sell their cane. There are some 30 sugar mills of more or less modern type. A part of the refining is done in the cane-growing sections, but more of the raw sugar is sent to two large refineries in Rosario and Buenos Aires. In addition to an average of 500 million pounds of sugar a year, 7 million gallons of alcohol are made from the molasses which is a residual product of raw-sugar making. At times, a little sugar is exported, but more often importation is necessary. The people of the United States consume about 100 pounds of sugar per person per year, a very large quantity. The people of Argentina consume about 60 pounds per person per year. The annual value of the raw-sugar crop is about 30 million dollars or somewhat less than that of wine.

Fruit Growing Not Well Developed.—Because of its wide range of climate, Argentina is capable of growing almost any kind of fruit. But fruit growing on a large scale requires two conditions that are still wanting, namely, an abundance of labor and ready access to great consuming markets. Labor of any kind is insufficient for the more pressing needs of the country, and the kind of experienced labor needed for successful fruit growing is scarce. The total population of the country is relatively small, and the ocean distances to Europe and the United States are long. However, Argentina is growing excellent fruit, especially on the sunny, irrigated lands of the west. Grapes for wine have already been mentioned; but table grapes of marvelously fine quality are grown and are exported to New York at a profit.

Oranges, lemons, limes, figs, apricots, prunes, and a long list of other fruits are raised, but only on a small scale. The present fruit industry is destined to grow to large proportions. From the southern countries, the fruit arrives in the United States at a season when our own fresh fruit is scarce. Exports of fruits from Argentina rose from \$45,000 in value in 1916 to \$204,000 in 1921.

(For references, see end of Chap. XII.)

CHAPTER XII

ARGENTINA: OTHER ECONOMIC ACTIVITIES

TRANSPORTATION

Waterways.—Three navigable rivers—the Paraná, the Paraguay, and the Uruguay—and the broad, shallow, estuary of the Rio de la Plata are all used for purposes of commerce. Nearly all the overseas trade of the nation passes through the River Plate estuary, and the commerce of the important river port of Rosario uses the Paraná. The service performed by these rivers has already been discussed on pages 207 to 211. They play a much more important part in the commerce of Argentina than any of the rivers of the United States now play in the commerce of this country.

Roads.—The Pampa is the part of Argentina which most seriously needs good roads, but it is deficient in road-building materials over the greater part of its extent. The fine Pampa soil has scarcely a pebble in it, and bed rock does not outcrop for stretches of hundreds of miles. In the Cordoba region of the north and in two ranges of rock hills in the southern part of Buenos Aires Province, rock is available, but the high cost of transporting it hundreds of miles makes its use in most parts of the Pampa quite impracticable. The result is that any large extent of hard-surfaced roads is scarcely possible in Argentina¹ for some time to come. Nor does any real road system yet exist in the country. Each land owner, of course, finds it necessary to have a right of way from his land to a railway station, and owners of the land have set aside and fenced broad strips of Pampa, usually two or three times as wide as roads in the United States, to be used as thoroughfares. After a hard rain, the fine Pampa soil churns into black mud under the hoofs of the horses and the wheels of the wagons. In a dry period, this mud turns to dust which is gradually blown away by the wind. Thus the highway becomes a sunken roadway in which

¹ In 1924, the country had 325 miles of good motor roads, 475 miles of additional motor roads passable throughout the year.

the water gathers after a rain, and it may resemble a shallow canal more than a highway. At favorable times of the year, the roads pack to a hard surface and become very much like our dirt roads in the United States. The ponderous wagons used in hauling farm crops are drawn by teams of four to twelve horses, sometimes with four to six horses driven abreast. This is, in part, the explanation of the excessive width allowed for the roads. So pressing are the demands for funds for many purposes that the government appropriations for roads are small. For example, such funds in a recent year were only \$375,000 for the great province of Buenos Aires. Many a single county in the United States expends more than this annually. A general land tax for road improvement has been proposed but is not popular with the large land holders upon whom the tax would fall heavily. A federal law (the Mitre law) provides that 3 per cent of the net receipts of the railroads shall be paid to the government to be expended solely in building roads and bridges leading to the railroad stations of the respective lines, but the income from that source has been small (\$556,000 for 1925). In periods of good prices, grain is hauled profitably as much as 30 to 40 miles to a railway station, but ordinarily 25 miles is about the limit of profitable hauling. The hauling of grain is commonly done by contract, and the price is arranged by agreement between the producer and the carrier, but an average price is between $\frac{1}{2}$ cent and 1 cent per bushel per mile. As a rule, it costs more to haul a ton of wheat from the farm to the railroad station in Argentina than it costs to ship it from Buenos Aires to Liverpool.

Topography and Railway Building.—The level topography of the Pampa which has so favored the agricultural and pastoral industries has no less favored the construction of railway lines. For miles, there is not a cut or a fill or a bridge. The cost of upkeep of the lines is low in comparison with the cost in most parts of South America. There is little or no snow in winter, no washouts due to violent floods; and the great producing area is compact and lies near the sea. Furthermore, the quantities of cereals and animal products which are to be transported are exceedingly large. These facts would seem to insure low cost of building and operating railways; but building materials, rolling stock, replacements, and much of the fuel had to be imported and still are imported from Europe or the United States.

The English are economical builders and operators of railways; yet the capital investment is so large that profits have been relatively small, averaging for many years 4 to 6 per cent but more recently reaching 6 or 7 per cent.

The Railway Systems.—There are five facts of primary importance concerning the railways of Argentina: (1) The country has the largest and best railroad system in South America, nearly 25,000 miles. (2) The railroads are mainly British-owned and operated. Somewhat less than 20 per cent of the total mileage is owned and operated by the Argentine government. (3) The roads are of three different gages; meter (3.28 feet), standard (4 feet 8½ inches), and broad (5½ feet), with the broad gage predominating. (4) All of the great systems focus upon Buenos Aires, with Rosario and Bahia Blanca as secondary ports. (5) The passenger and freight service are of good quality but are more expensive than in the United States.

There are three major railway systems, each having upwards of 3,000 miles of line: (1) the Central Argentine, (2) the Buenos Aires Great Southern, and (3) the Buenos Aires and Pacific. These are all British-owned lines and are broad gage. The first railway (6 miles long) in Argentina was opened in 1857. The growth of lines was gradual until 1900 when the total mileage reached 10,000. In the next decade, it nearly doubled, and in 1925 had reached about 25,000 miles, by far the greater part of which is in the Province of Buenos Aires. Over 1 billion dollars of British capital is invested in Argentine railroads.

The passenger trains between the principal cities are frequent and modern, including dining-car and sleeping-car service. The electric suburban trains in and out of the capital are among the best to be found anywhere. Over 500 passenger trains leave Buenos Aires daily, and the terminal stations in that city are palatial. The time schedules of the through trains are fast, and trains are prompt in arriving and departing. The government lines have been built mainly in the outlying parts of the republic for the purpose of promoting the development of those regions. As a rule, these lines have been operated at a loss. Extensions of both private and government lines are going on steadily. In spite of the 25,000 miles of railway, the country needs double the present mileage, for there are great areas of productive land which are still 30 or 40 miles or more from a railway station.

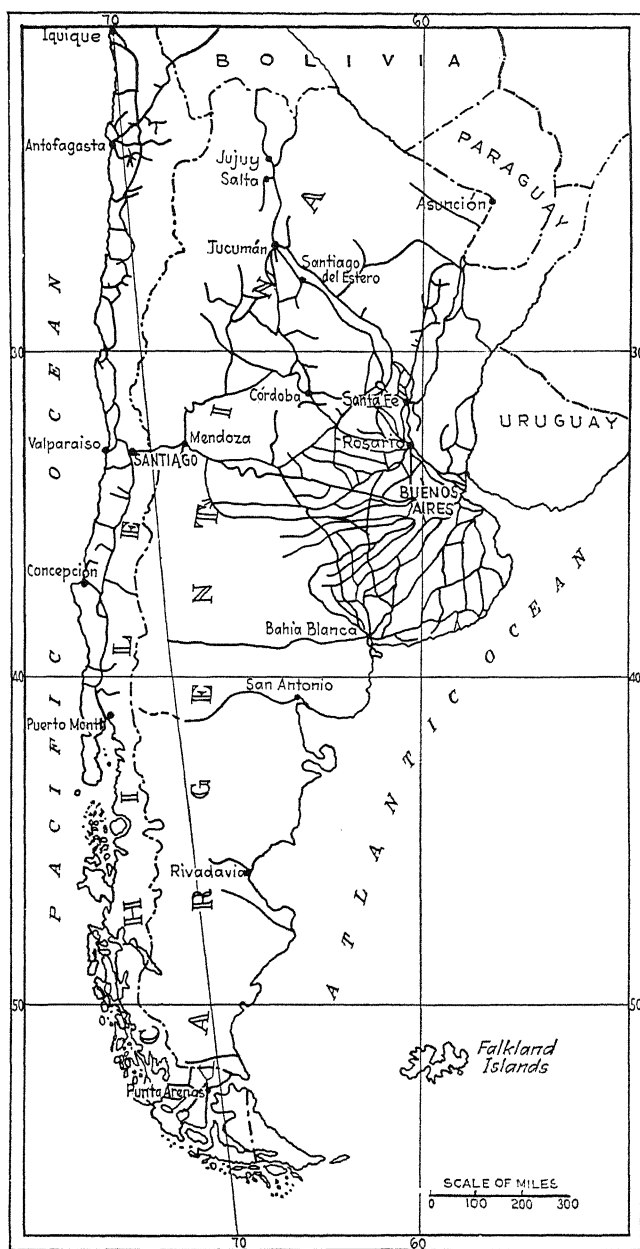


FIG. 125.—Principal railroads of Argentina and Chile.

Narrow-gage, light railways can be laid on the level pampa for less than the cost of good highways, and some estancias are being connected with the main railways by these "decauville," or light railways, built and operated by the large land owners for their own use.

Earnings of Argentine Railroads.—In 1923, the railroads of the eastern district of the United States earned an average gross income of \$50,000 a mile, while the average for all roads in the United States was \$22,000 a mile. In Argentina, the government roads earned \$4,600 a mile; the Central Argentine, the leading railroad of the country, earned \$20,000 a mile, and the average of all privately owned Argentine roads was about \$10,000 a mile. It is evident that, on an average, the railroads of the United States earn somewhat more than twice as much gross per mile as do those of Argentina. The Argentine railroads, however, are capitalized at a lower figure than are United States railroads, and so the dividend payments of the latter are actually no higher.

The Argentine-Chile Transandine Railroad.—This is one of the world's famous railways. It was opened in 1910 after long years of struggle on the part of many engineers to conquer the defiant Andes. The Argentine portion of the line was the less difficult to build, for the slope is less precipitous; the ascent is spread over 110 miles, while an equal ascent to the famous Uspalata Pass from the Chilean side is made in 40 miles. Gradients of 8 per cent (8-foot rise to 100 feet of track) are necessary, and locomotives climb such grades by use of the cog device known as the rack and pinion. At the highest point (10,452 feet), the railroad passes through a 2-mile tunnel. The railroad is a masterly piece of engineering, extremely difficult to build, and very costly to protect from the heavy snows, avalanches, and landslides of the Andes. Miles and miles of concrete and timber snow sheds have been built, and only since 1919 has the line been kept open throughout the winter. The Chilean section, which has cost over \$300,000 a mile, has had to receive generous government aid and can never return a profit on the present capitalization. The twice-a-week International Pullman train is excellent; it covers the distance of 900 miles from Valparaiso to Buenos Aires in 36 hours and charges about \$100 United States currency, or about 11 cents a mile. There is very little freight traffic. The Argentine portion, now consolidated in one company from Buenos Aires to the summit of the Andes, is part of the Buenos

Aires and Pacific, a British system. The Chilean Transandine Railway is privately owned but receives government aid. Thus there are three links in the transcontinental line; (1) the broad-gage Chilean portion, (2) the meter-gage mountain portion, and (3) the broad-gage Argentine portion from Mendoza to Buenos Aires.

The statue of the Christ of the Andes, erected as a pledge of enduring peace between Chile and Argentina, stands at the pass of the Andes under which the railway tunnel is built (Fig. 126).

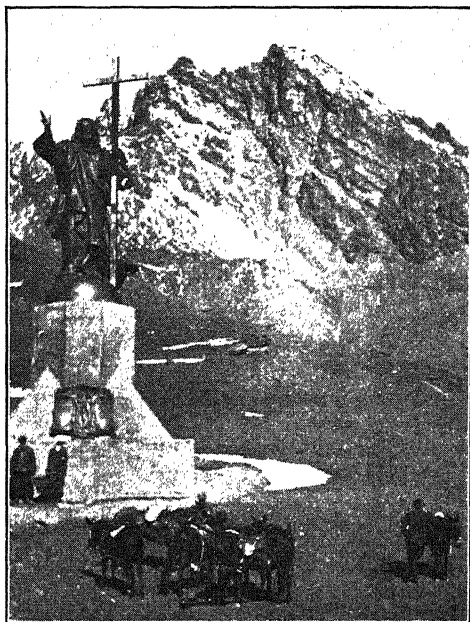


FIG. 126.—Statue of the Christ of the Andes, on the Argentine-Chilean boundary at the crest of the Andes.

The Transcontinental Railroad through Bolivia.—An Argentine railway reaches to the boundary between Bolivia and Argentina, and Bolivia has completed a line to the same point. This gives rail connection between Buenos Aires and La Paz and thence by three different railroads to the Pacific. It is a long route through thinly settled regions and will be little used for years to come.

Railway Connections with Paraguay and Brazil.—One railway line extends to Asuncion, the capital of Paraguay, and thus

connects that city with the Argentine railway system. Railways have also been completed which connect Buenos Aires and Montevideo with the Brazilian railroads which reach São Paulo and Rio de Janeiro. These are relatively new lines, badly graded and poorly equipped. As yet, they are little used for international traffic.

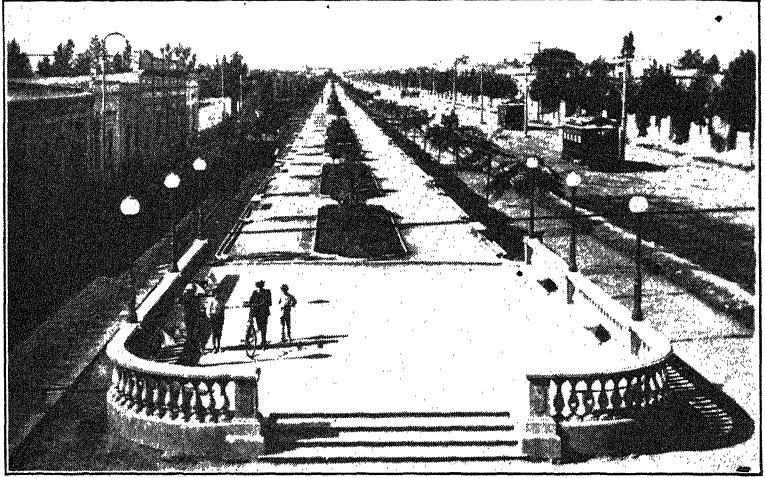


FIG. 127.—Paseo de la Alameda in the city of Mendoza, at the foot of the Andes. The city is surrounded by grape vineyards and is the most important wine-making center in South America.

MANUFACTURING

Progress of Manufacturing.—Argentina is essentially a producer of primary products, especially products of the farm and ranch. It has not reached the industrial stage, and in view of its shortage of fuel, power, and metals, it can scarcely expect to become an industrial nation very much beyond supplying a part of its own requirements. The country has always imported a large part of its highly manufactured goods and probably will long continue to do so. The annual consumption of coal for all industrial purposes is less than 1 million tons, and there are only two large hydroelectric plants in the country. Certain lines of manufacturing, however, are already well developed. Several of these have been mentioned: sugar, wine, packed and preserved meats, quebracho extract, flour, and dairy products. In all of these, the country is nearly or quite self-sufficient and is a large

exporter of four of them. All of the leading manufactures are made from products which the country produces in large quantities. Most of them are made with standardized machinery which is not delicate or complicated and does not demand highly specialized laborers. As a class, these manufacturers are moderate or small users of fuel. The processes by which the products are made are relatively simple. In addition to these leading industries are others, such as wool washing, leathertanning, petroleum refining, cotton ginning, and cotton and woolen textile making, which also use Argentine raw materials.

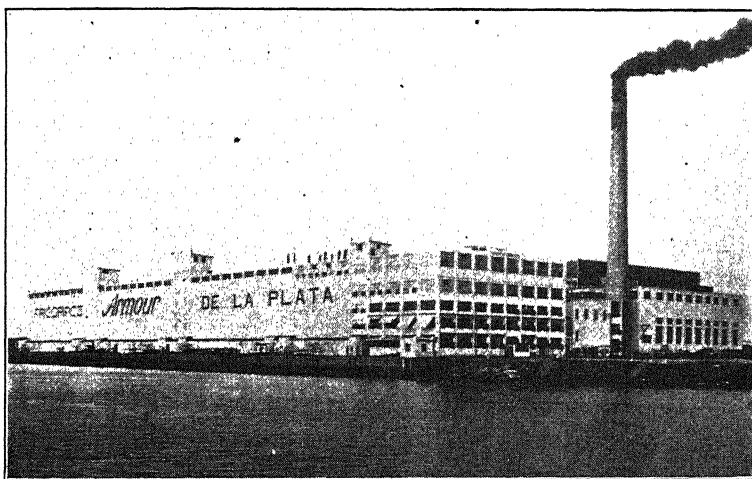


FIG. 128.—Part of the Armour 20-million dollar slaughtering and meat-packing plant at La Plata, Argentina. (Courtesy Armour and Co.)

Besides these primary manufactures, Argentina has made progress in manufactures of more complex character in which imported raw materials are considerably used. A large part of the shoes, hats, glass, cottons, woolens, and furniture are made within the country, especially in Buenos Aires. Candy, soap, tobacco products, matches, brick, wood products, and many other articles are made under the protection of a high tariff. Without this tariff, many of these articles could not be profitably made, for the cost of manufacturing is generally higher than it is in the older industrial countries.

An estimate made by an official Argentine bureau¹ indicates that 71 per cent of the products manufactured in the country are made

¹ Naciones Utiles sobre la Republica Argentina, 1924.

from raw materials produced within the country. Of all the groups of manufactures, only three—metal products, chemical products, and textiles—are mainly dependent upon imported raw materials.

Three of the leading branches of manufacturing are carried on in outlying parts of the republic where the necessary raw materials are produced; (1) wine in Mendoza and San Juan; (2) sugar in Tucumán and Jujuy; and (3) quebracho extract in the Chaco. The greater part (80 per cent) of all manufactures is made in Buenos Aires province and city. Here are located most of the meat-packing plants, flour mills, and miscellaneous manufactures.

The industrial census of 1913 lists 48,779 manufacturing establishments, large and small, with an annual output valued at about 800 million dollars, or an average of \$16,000 of products to the establishment. The majority of these were small shops in which one to four persons worked at the hand trades. It is probable that the output for 1925 would be more than double that of 1913, or approximately 2 billion dollars, which was the value of the manufactures of Philadelphia in 1919. Like all aspiring peoples, the Argentines desire to reduce their dependence upon imported goods and, as far as possible, become a self-contained nation; but this ideal can be achieved in Argentina in only a moderate degree because of the fundamental shortage of fuel and metals.

MINERALS

A Land of Small Mineral Wealth.—The most serious handicap under which the Argentine nation must develop is the absence—almost the total absence—of coal and iron. So vital are these two minerals in the development of manufacturing that any country that does not possess them and cannot get them cheaply is at a tremendous disadvantage so far as manufacturing and railway transportation are concerned. Moreover, the probability of finding in Argentina large quantities of either of these minerals in hitherto undiscovered deposits is very remote. Argentina evidently must devote its main energies to those lines of manufacturing which can bear the cost of imported coal and iron.

The only important petroleum field is near the coast in the Territory of Chubut, 900 miles south of Buenos Aires. This, the Comodoro Rivadavia field, is controlled and worked mainly by

the Argentine government. Several private companies expended a total of 30 million dollars in exploration, drilling, and other efforts but found only small quantities of oil. The total production of Argentina has reached several million barrels a year, and expectations of a larger production are announced by government officials. Successful wells have been sunk in the northwestern part of the republic, and further drilling is in progress. The same is true of the Territory of Neuquen in Patagonia but all of the fields are, as yet, small producers. In a country

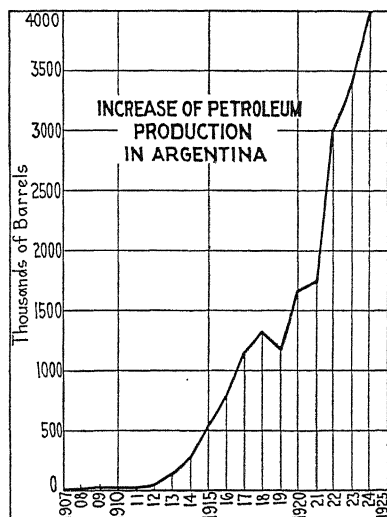


FIG. 129.—The production of petroleum is important in a country that has practically no coal.

which has practically no coal and only a relatively small potential water power, petroleum is important and will be sought with exceptional diligence.

Tungsten deposits yielding 8 or 10 per cent of the world's supply are worked in the north-central part of the country. Unimportant quantities of gold, silver, copper, lead, and zinc have, from time to time, been mined in the mountains of the west, but the difficulties of transportation and the long distance from the principal markets made these mining efforts unprofitable, and little is now being attempted. Small quantities of salt, borax, and antimony are mined, but the total mineral production is

trifling in comparison with the major industries of the country. The presence of rich mineral deposits in many other parts of the Andes make it seem probable that they will also be discovered in the Argentine portions of these mountains.

FOREIGN COMMERCE

The Phenomenal Rise of Exports.—The prolonged period of civil strife which retarded Argentina for nearly half a century came to an end about 1860. Between 1864 and 1924, the population of the country was multiplied by six, but the exports were multiplied by thirty-six. This is a phenomenal growth, and reflects the tremendous producing power of the country, even with its small population. The exports of this pastoral-agricultural land have exceeded the sum of a billion dollars a year, or more than \$100 for every person in the country. The highest figure for total exports from the United States is \$73, while the average for recent years has been \$40. In proportion to the number of persons engaged in productive occupations, Argentina ranks among the leading nations in the value of its exports. The fertile Pampa, with its genial climate, its great fields of alfalfa and cereals, and its almost countless cattle and sheep, is one of Europe's great sources of food; for with its limited home consumption, Argentina has large quantities for shipment abroad.

Nature of the Exports.—At times in the recent past, the value of animal products exported surpassed that of agricultural products, but this is not usually the case. Ordinarily, agricultural exports represent 55 to 60 per cent of the total value, animal products 35 to 40 per cent, and all others less than 5 per cent. The great exports are, of course, the same as the leading products, wheat, flax seed, corn, meat, wool, cattle hides, and sheep skins. Three exports amount to the huge total of 10 million tons a year—cargoes for five or six freight steamers every day.

The only important export outside of the pastoral-agricultural group is quebracho extract which averages 200,000 tons a year.

Destination of Exports.—Nearly all of the meats and cereals are sent to Europe, although Brazil is a large buyer of Argentine wheat. Of European purchasers, Great Britain is easily the leader. The United States has become a large buyer of Argentine wool, hides, and flax seed and is a leading importer of quebracho extract. Purchases of Argentine products by the

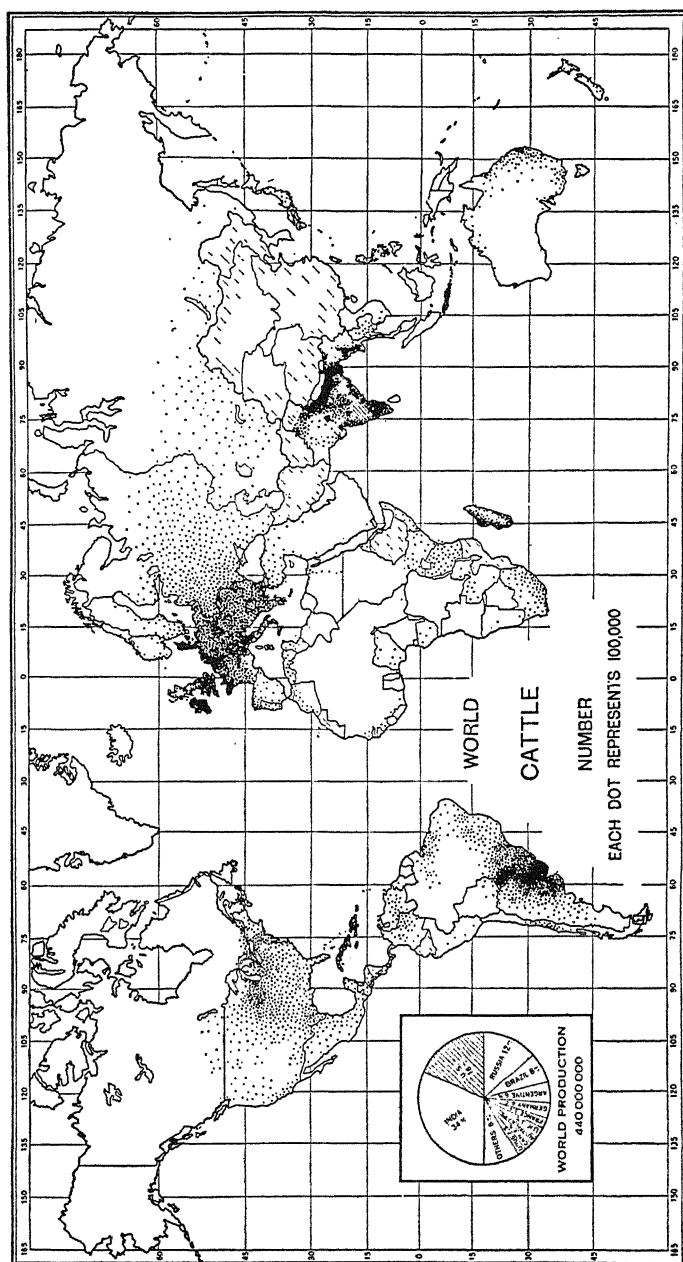


FIG. 130.—Cattle-raising regions of the world. (1921 Year Book, U. S. Dept. of Agr.)

United States have greatly increased since the opening of the World War, due in part to better steamship service and closer business relations. Great Britain has long been the leading buyer of Argentine products because of the close financial relations between the two countries and because Great Britain is the world's largest importer of foodstuffs and raw materials. Until quite recently, the United States was a minor purchaser of Argentine products, but it is now second only to Great Britain.

Value, Character, and Sources of Imports.—As a rule, the exports of new, fertile lands, like Argentina, exceed the imports. A new country that is almost wholly a producer of raw products

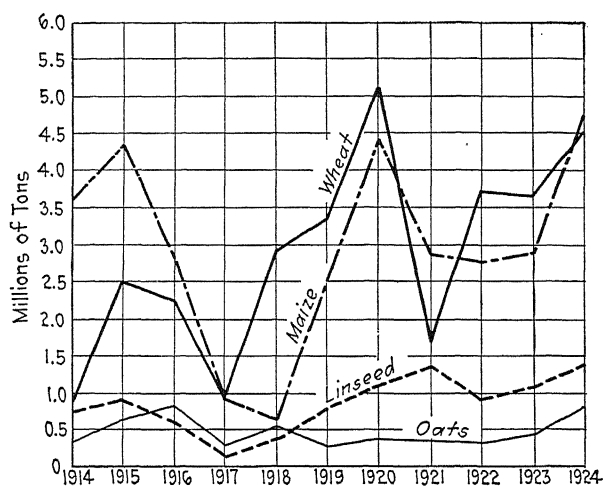


FIG. 131.—Cereal exports from Argentina 1914–1924.

can produce most of the essentials of life in a pioneer society; but as the country develops, it needs machinery, building materials, railway materials, and many other manufactured articles that it is not prepared to make, and there is an increasing demand for imported luxuries. Such a country also needs foreign capital, another form of import. Argentina is now using between 2 and 3 billion dollars of foreign capital upon which interest and dividends must be paid. Just as the United States was, for a century, a debtor nation, using foreign capital, so Argentina will long continue to be. The country is sending away upwards of 100 million dollars a year to pay interest and dividends to foreign investors. This must be sent in the form

of the country's products; hence, Argentina ought to be exporting much more in value than it imports every year, and as a rule, it is successful in doing this.

Nearly every kind of manufactured product is included in the imports; quite naturally textiles and metal products are the most prominent. Agricultural machinery, automobiles, lumber, and petroleum products come mainly from the United States. Textiles, railway materials, and coal come mostly from Great Britain. These two nations supply two-thirds of the total imports into Argentina. During the World War, the United

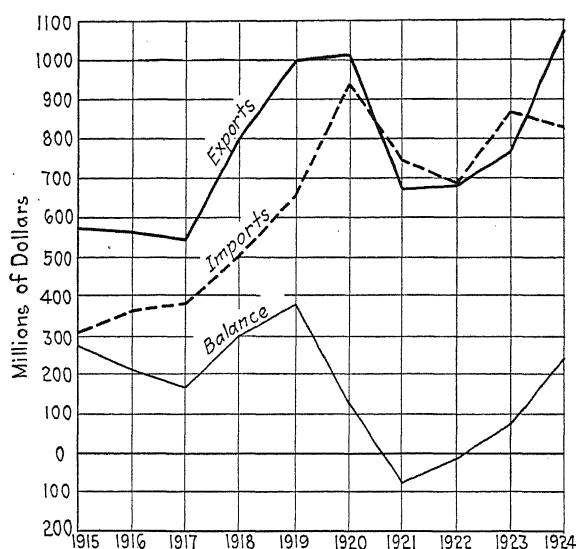


FIG. 132.—Relative values of imports and exports of Argentina. Rarely do imports exceed exports.

States became the chief supplier of Argentine imports, but it may not hold that position as Great Britain gradually comes back. However, one of the outstanding changes in the last decade in South American commerce is the greatly increased trade with the United States.

In Argentina, the British are strongly entrenched by reason of (1) their great investments there, (2) the large number of British banks and commercial houses, (3) the high esteem in which British business men and business methods are held, and (4) the high proportion of Argentine products that are sold to Great

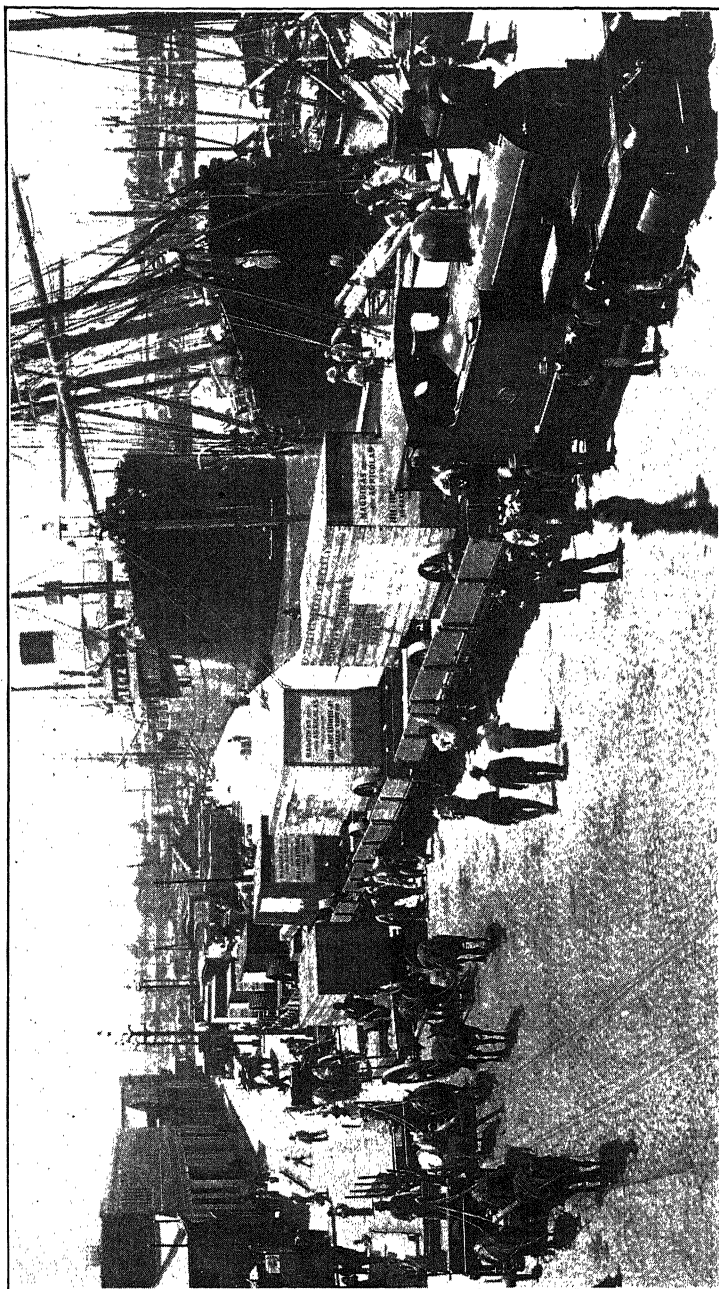


FIG. 133.—Scene along the water front of Buenos Aires, chief commercial port of South America. (Photo by H. G. Olds.)

Britain, requiring excellent steamship service between the two countries.

THE CHIEF PORTS

Buenos Aires.—No city in the United States is even approximately so important to this nation as Buenos Aires is to Argentina. One person in every five in Argentina lives in the capital. The next 20 cities combined do not have the population of Buenos Aires alone. It is the focus of all the important railway



FIG. 134.—Scene in Buenos Aires, one of the most beautiful cities of the world. Population nearly 2,000,000. (Photo by H. G. Olds.)

systems. It does more manufacturing than all the other cities of the nation, and through its port passes 80 per cent of the foreign commerce of the country.

It is the largest city of the southern hemisphere, and among the Latin cities of the world, it is surpassed in population only by Paris. It has grown with phenomenal rapidity, rising from 178,000 in 1869 to 1 million in 1905, to nearly 2 million in 1925.¹ Few cities in the world have grown so rapidly. It is a city of

¹ A census by the police department in 1925 placed the population above 2 million.

great wealth, of beautiful avenues, parks, residences, and suburbs; of expensive and extravagant living on the one hand, and of poverty on the other; for wealth is not well distributed. It is relatively free from smoke and has all of the most modern utilities.

The city is 155 miles from the open sea, near the head of the Rio de la Plata estuary, which is here 34 miles wide but very shallow. The city owes its location to the mouth of a little

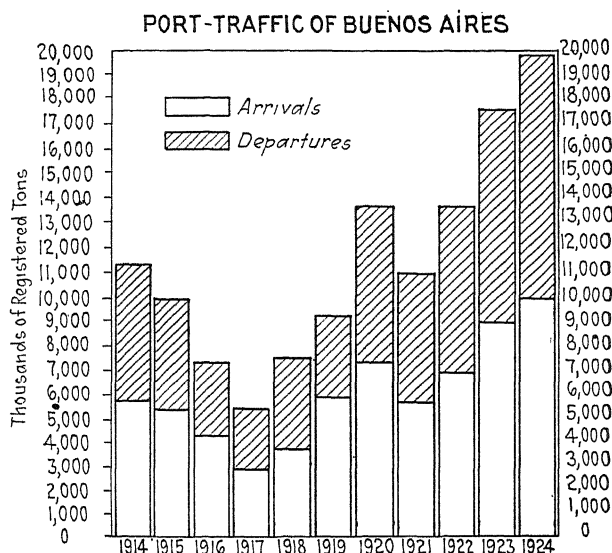


FIG. 135.—(After Tornquist.)

river, the Riachuelo, which offered the only site for an early harbor for scores of miles along this coast. The first port works were at the mouth of this river, but they were soon outgrown. Until the modern channels were dredged, steamers drawing more than 15 feet could not get within 12 miles of Buenos Aires but had to receive and deliver cargoes by means of lighters. The new docks are of the most modern basin type, equipped with warehouses and elevators, served by many lines of railway, and affording the most excellent facilities for handling sea-borne commerce. Yet, even these are inadequate, and very expensive new docks are under construction (Fig. 136). The

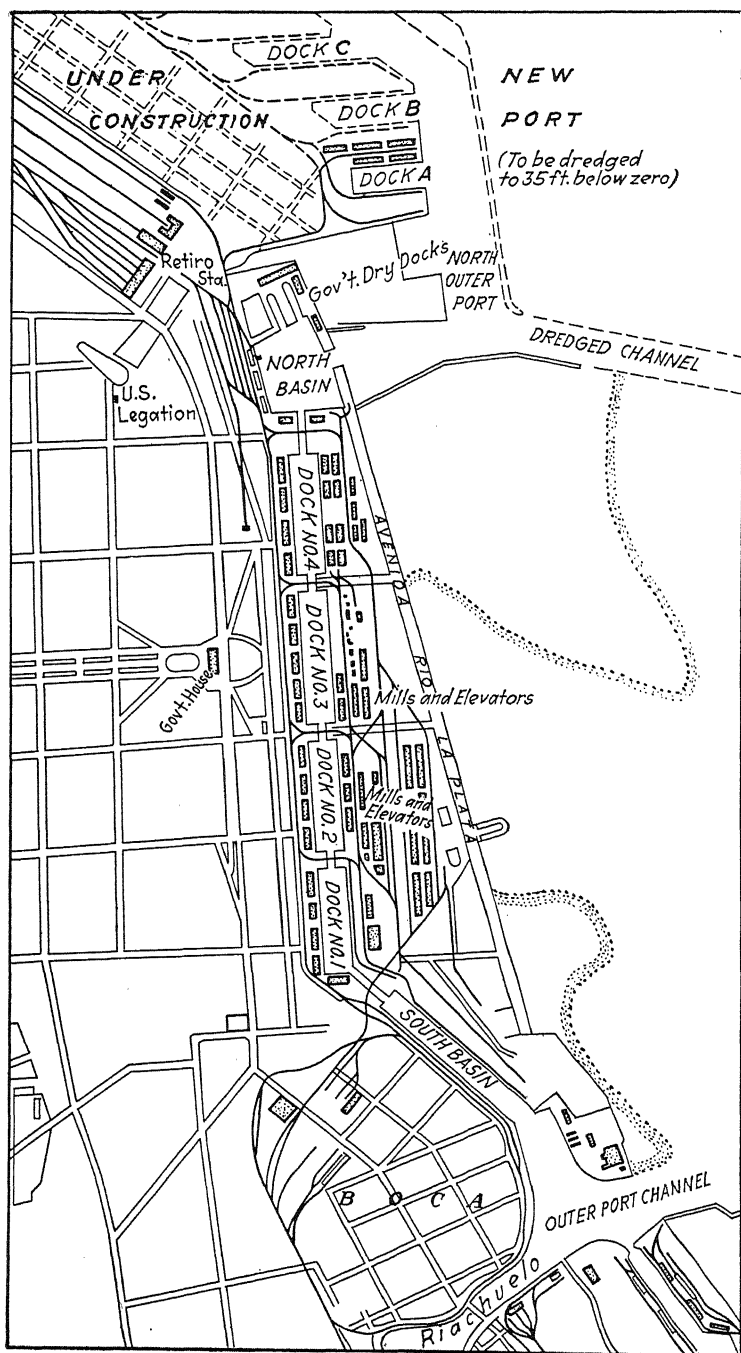


FIG. 136.—Port facilities of Buenos Aires, upon which a vast sum of money has been expended. (U. S. Coast Survey.)

harbor improvements will have cost 100 million dollars by the time present plans are completed. The river carries so much silt that constant dredging of the channels is necessary. The port of Buenos Aires is an instance of man's conquest of an unfavorable environment, for nature did very little toward providing harbor facilities for this city. In this respect, Buenos Aires is quite unlike Rio de Janeiro, New York, or Sydney, where nature provided such perfect harbors.

The port traffic of Buenos Aires is very heavy and has grown marvelously. The arrival and departure of ships grew from 9 million tons in 1919 to 20 million tons in 1924. The latter figure is nearly equal to the net tonnage of ships that passed through the Panama Canal in 1924 and is more than half the tonnage of ships entering and leaving New York harbor. The remarkable thing is that Buenos Aires has become the huge, beautiful, wealthy city and great port that it is within the life of people still living.

Rosario (population 250,000) is the second city in size and the second port in traffic in Argentina. It is on the west bank of the Paraná, about 200 miles north and west of Buenos Aires. It owes its location (1) to the firm river banks, 50 to 75 feet high, which here skirt the river; (2) to the considerable depth of water which the somewhat swifter current here maintains; and (3) to the great agricultural productivity of this section of Argentina; for southern Santa Fé and Cordoba have some of the finest cereal and grazing lands of the republic. Ocean-going steamships of 26-foot draft ascend the Paraná to the modern port works which a French company has installed at Rosario. Five railroad systems connect the port with the surrounding country and deliver to it 3 million tons of export cargo yearly. It is one of the largest grain-shipping ports of the country. The city has grown rapidly and constitutes the secondary commercial center. The Paraná, however, is not an easy river for ocean steamers to navigate, and Rosario is not likely to gain very much in relative commercial importance. The traffic by river boats is large; 2,000 steamer calls, and several hundred sailing boat calls are made annually at the port.

Bahia Blanca (population 50,000) is the southern port for the shipment of the products of the Pampa. It is 250 miles south of Buenos Aires on a well-protected harbor upon which millions of dollars have been expended for railway terminals and port works. This port was developed for the purpose of relieving the conges-

tion of shipments at Buenos Aires in the autumn. A special railway some 400 miles in length connects the port of Rosario and that of Bahia Blanca and cuts across nearly every important railway line of the republic. It thus serves as a great outer belt line through the Pampa.

La Plata (population 160,000) is a sort of outer port for Buenos Aires, and is 50 miles nearer the sea. It is an almost wholly artificial port. The city is the capital of the province of Buenos Aires; it is a made-to-order city, one of great expectations, many of which have not been realized.

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CHAPTER XIII

URUGUAY AND PARAGUAY

URUGUAY

Historical Background.—The little country of Uruguay, formerly known as the Banda Oriental, has had a stormy career. On two occasions, it was for short periods annexed to the Argentine Confederation. At another time, it was claimed and held as a part of Brazil. In the long, bitter war against the Paraguayan dictator, Lopez, it fought as an ally of both Brazil and Argentina; and during more than half of its period as an independent nation, two hostile factions within the country (the Colorados and the Blancos) fought each other more or less continuously. Yet the country has prospered and progressed. In 1800, it had only a scattering of people, not to exceed 30,000; but this nucleus grew to upwards of 800,000 in 1900 and was double that number in 1925.

Most of the Indians were exterminated, and persons with negro blood are mainly confined to the region of the Brazilian border. Nearly the entire Uruguayan population is of European stock and are an upstanding and forward-looking people; a small nation, but one of the most progressive in South America.

The Geographical Environment.—Uruguay is the smallest of the South American republics (72,000 square miles). It is both a part of the River Plate lands, separated from Argentina by the Uruguay River, and also a southern prolongation of the Brazilian hills. It is less flat than Argentina and less hilly than the adjoining part of Brazil. There is almost no waste land. For the most part, it is a rolling, grassy plain with few forests and no mountains—an excellent grazing land. The sea and the estuary of the River Plate form half of its boundary and give to the country an essentially oceanic climate, perhaps the most agreeable possessed by any South American people. On this coast has grown up one of the most fashionable bathing resorts in the southern hemisphere, and to it flock the wealth and gaiety of Argentina and Brazil as well as of Uruguay. Snow almost never

falls in any part of the country, and even frosts are infrequent. The rainfall averages over 40 inches a year, but occasionally serious droughts occur,¹ as they do in Argentina. On the coast the summers are delightful: in the interior they become hot, but not for a long period. So far as surface features and climate are concerned, Uruguay is a happily situated country.

A Country of One Main Resource and One Main Industry.—

The natural wealth of Uruguay lies in its soil and in its wide, rolling pastures, clad in nutritious grasses, somewhat richer than the native grasses of Argentina, but less rich than the Argentine alfalfa fields. Uruguay has made little headway with alfalfa, partly because its native pastures are good.

Less than 5 per cent of the land is under the plow, and there is scarcely any increase in agricultural production. The typical Uruguayan is first, last, and always a ranchman. He loves the saddle and the green and billowy pasture lands with their herds of grazing cattle and flocks of sheep. Even less than his Argentine neighbor does he take to the plow and the cultivator. He knows an easier and pleasanter way to obtain wealth from his lands, and he takes little interest in the laborious life of a farmer. Less than 8 per cent of the population is engaged in agriculture. In no other country of the western hemisphere do the economic interests of a whole nation so completely center in the single industry of stock raising as they do in Uruguay. Practically every other phase of industry depends upon the raising of sheep and cattle, and 70 to 80 per cent of the land is devoted to pastures. This specialization is the consequence of (1) favoring geographical conditions, (2) the sparse population and large land holdings, (3) traditional preference of the people for the free, open-air life of the ranchman, and (4) the profitableness of the industry. Undoubtedly in Uruguay, as in its larger sister republic of Argentina, stock raising has been the most logical way of utilizing the great holdings of grass land; for such land is abundant, laborers are few, and the mildness of the winters makes unnecessary the building of shelters for the animals. Where people are very numerous and land is scarce, as in Japan, the land must be intensively cultivated in order to feed the people. There the securing of food for an overpopulation is the controlling motive.

¹ Unfavorable weather conditions led to the death of 600,000 cattle and 5 million sheep in 1914, and the drought of 1916 caused the death of 1½ million cattle, *U. S. Commerce Report*, Dec. 10, 1918.

In a land like Uruguay, the problem is reversed and becomes, How can a small population utilize much land in a way to get satisfactory returns? In 1908, Uruguay had more than 35 million head of live stock, mainly sheep and cattle, or thirty-five times the human population of the country. The number of animals is now considerably smaller, but the quality is higher. The pure-bred and cross-bred sheep yield more than twice the weight of wool that the native breeds yielded; and improved breeds of cattle yield more and better meat than the old Spanish long-horns. In spite, then, of the declining number of sheep and cattle in the country, the value of the animal products exported is now double what it was in 1908 or in previous years.

The Sheep-raising Industry.—Before the perfecting of refrigerating methods and refrigerator ships, the chief product of Uruguay was wool. As a rule, sheep are raised on the poorer lands of the earth and especially on the drier lands, because sheep are able to subsist on scanty pasturage where cattle cannot thrive. Moreover, wool is a good commodity to produce in places remote from the world's great markets, because it can be shipped long distances. It is valuable in proportion to its weight and can stand the freight charges for a long sea journey. The latter was formerly the chief reason for specializing in sheep raising in the River Plate lands; it was not the poor quality of the land or the dry climate, for Uruguay has good land and usually has ample rainfall. As recently as 1919, Uruguay exported 150 million pounds of wool valued at the huge sum of 65 million dollars. This was an exceptional year's shipment, and two or three times the usual value. This product ranks either first or second in the list of Uruguayan exports, sometimes rising above meat products and sometimes falling below. The annual wool clip of the country averages \$20 per capita of the population as compared with less than \$2 in the United States. In proportion to area and population, Uruguay has been the foremost sheep-raising country of the world, although on account of its small area, its absolute rank has usually been seventh or eighth. On the whole, the relative importance of sheep in Uruguay is slowly declining and that of cattle is increasing (Fig. 106).

Cattle Raising.—A half-century or more ago, cattle in Uruguay were killed mainly for their hides and for the making of jerked beef. At one time, 20 *saladeros*, or salting plants, devoted themselves to slaughtering the lean cattle, drying and salting the beef,

and exporting it to Cuba and Brazil. This method of preparing meat for shipment was the principal one for several decades, and is still employed on a considerable scale. In the 5-year period 1904–1908, $2\frac{3}{4}$ million cattle were slaughtered in the saladeros, and an average of some 100 million pounds of the dried meat (*tasajo*) was exported annually. Of late, the production of this type of meat has become relatively small for three reasons: (1) the declining importations into Brazil, which now supplies most of its own meat; (2) the higher price of cattle; and (3) the increasing practice of chilling and freezing meat. The rise of refrigera-

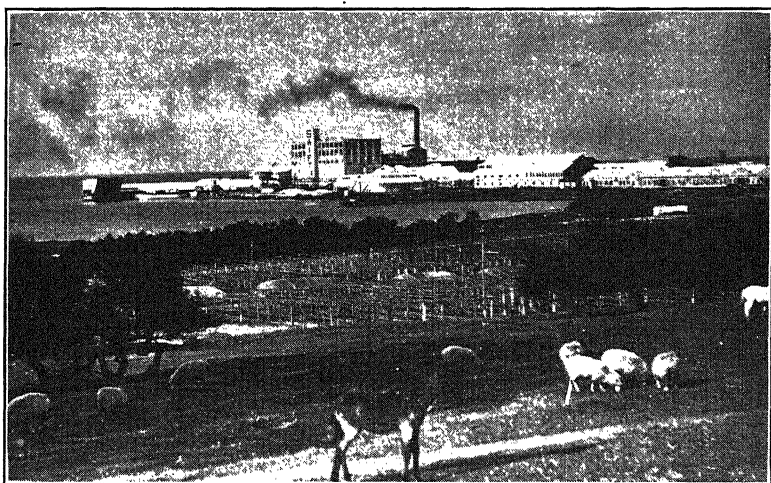


FIG. 137.—View of the slaughtering and meat-packing plant of Swift and Co. near Montevideo, Uruguay. (Courtesy Swift & Co.)

tion and the decline of drying and salting beef and of making beef extract may be seen in the change between 1913 and 1921:

	1913	1921
Cattle slaughtered for chilling or freezing.....	132,650	275,667
Cattle slaughtered for drying and salting.....	253,600	87,707
Cattle slaughtered for beef-extract factories.....	81,100	15,959 ¹

¹ Supplement to U. S. Commerce Report 23, p. 10.

While native cattle were cheap, thousands of them were slaughtered each year, and their meat used in making beef extract. The most famous of the five beef extract factories is the great Liebig establishment at Fray Bentos on the Uruguay River, where 75,000 to 100,000 cattle a year were formerly slaughtered. But

this large industry has declined with the rise in meat prices, for it can prosper only on cheap cattle (Figs. 102, 103).

There are four modern packing plants in Uruguay, three belonging to the Chicago packers and one to an English company (Fig. 137). The largest plant belongs to Swift & Co. These packers are called a trust in South America and became unpopular there as they did in the United States. In Argentina, also, there has been a demand for government-owned packing plants which should free the ranchmen and the public from the trust.

A large part of the beef prepared in the Uruguayan packing plants in the past has been frozen rather than chilled. This is

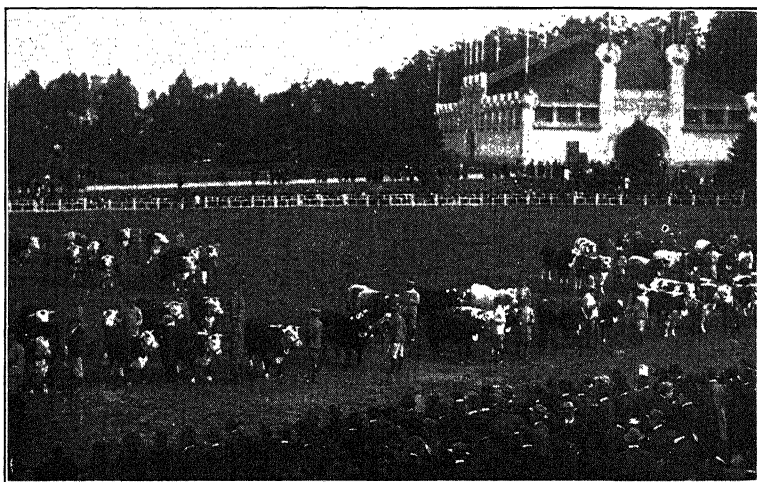


FIG. 138.—Cattle show at Montevideo. Like Argentina, Uruguay is also a land of high grade cattle.

due partly to the lower grade of many of the cattle, the better meat being chilled rather than frozen. Large quantities of meat are also canned. The foremost of the animal products (by weight) exported from Uruguay is frozen beef, and the value of meat and meat extracts considerably exceeds the value of wool. These two items, meat and wool, account for about three-fourths of the value of all exports from Uruguay. The demand for good cattle by the packers not only has caused an increase in cattle raising in Uruguay but is leading to an improvement in the quality. In addition to the large exportations of beef products, Uruguay is a very large supplier of cattle hides—a million or more yearly.

The Minor Importance of Agriculture.—It has already been pointed out that the people of Uruguay do not take to agriculture, partly because they are not fond of work, and partly because of the small population of the country. Only 1 acre in 20 of the land is under cultivation. Three crops occupy 90 per cent of the cultivated land; wheat is raised on half of this area, while corn and oats together occupy as much more land. Owing to the small production of cereals and other vegetable foods, the people of Uruguay eat a great deal of meat, and also import agricultural products. Moderate quantities of fruits are grown, especially wine grapes. The government has a 1,000-acre experimental farm and is seeking to stimulate interest in agriculture and to increase the agricultural output of the country, but only slow progress is being made. Immigrants come into the country slowly, partly because of the high cost of living in Uruguay and partly because they find it difficult to secure land.

The locust pest is a menace to the growing crops, and considerable damage is done nearly every year. The government maintains an organized force of men, known as the *Defensa Agrícola*, trained in combating the locusts. Soldiers of the regular army cooperate in times of need, and thus the ravages of the pest are held in check.

Transportation Facilities.—Because of the rolling topography and good drainage, the country roads in Uruguay are somewhat better than those in Argentina. Not infrequently, they are extremely wide (100 feet or more) and include strips of grass land upon which flocks and herds may feed while being driven long distances. For the most part, however, the 2,300 miles of national roads are but slightly improved, and only 300 to 400 miles are macadamized. The many streams in the country call for an unusually large number of bridges which in that country are expensive. Poor roads are less of a handicap in a pastoral country than in an agricultural country, for sheep and cattle can be driven to markets and to railway stations. There is, nevertheless, a sustained interest in good roads, stimulated by 14,000 motor cars in Montevideo alone (1925), and 7,000 in country districts.

The railway system (dating from 1865) consists of a main system of about 1,000 miles, the Central Uruguay, and several lesser systems which act as feeders (Fig. 139). The whole system converges upon Montevideo, the chief city and port. It is nearly

all of standard gage. In proportion to area, Uruguay has more miles of railway than any other country in South America and is exceeded only by Cuba in all Latin America. Nearly all of the lines are owned by British capital and are under efficient British management. A short mileage of state railways has been built.

For various reasons, the railways have been somewhat costly to build, and since fuel, materials, and equipment are largely imported, the cost of operation is high and freight rates are high,

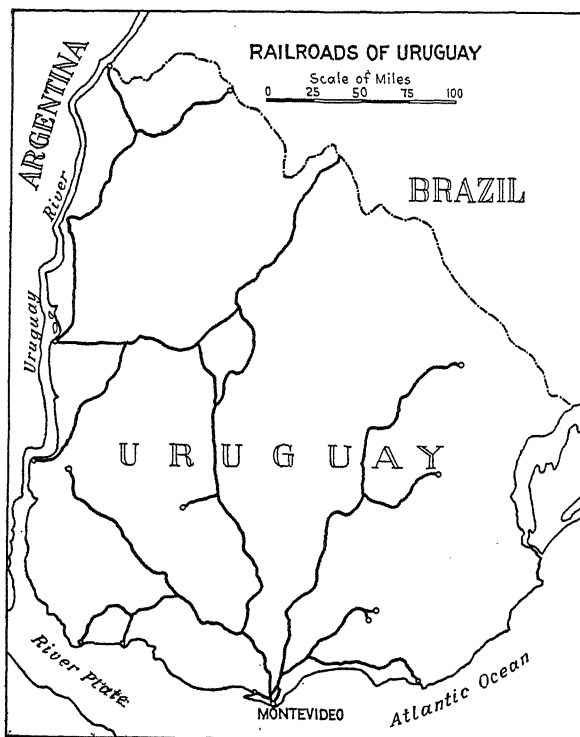


FIG. 139.—The railway system of Uruguay converges on the port of Montevideo.

at least in comparison with average rates in the United States. An important reason for the high rates is the unbalanced movement of traffic. Most of the tonnage is moving toward the ports, especially Montevideo, and little is moving in the opposite direction.

By 1911, various railways in Brazil and the main railway in Uruguay had been linked up for a distance of 2,000 miles, from Montevideo to Rio de Janeiro. It is a long and somewhat

uninteresting journey requiring 4 days; the service is not yet good, and there is relatively little through traffic. The ocean route is still preferred.

Montevideo.¹—The capital, chief city, and chief port of Uruguay has approximately 400,000 people, a quarter of the population of the country. It dates from 1726, and is, therefore, a much younger city than Buenos Aires. The city owes its location to a small peninsula and a partially protected bay which make a natural harbor possible at this point on the coast (Fig. 140). The site is also favorable for ocean commerce in that it is virtually

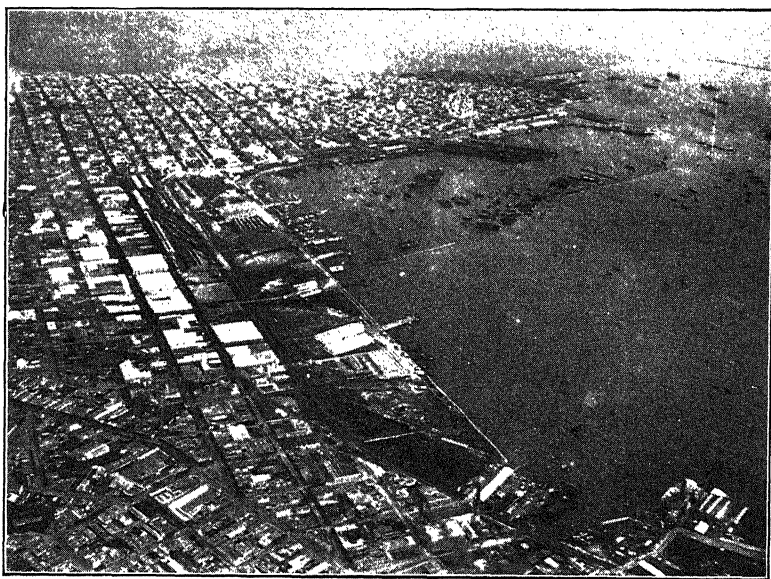


FIG. 140.—Airplane view of Montevideo and its harbor.

at the outer end of the River Plate estuary, a half-day's sailing below Buenos Aires. By nature, Montevideo is a better port than Buenos Aires; however, the latter has been improved and equipped in a superior manner but at great cost. Over 40 million dollars have been expended on Montevideo harbor and its port facilities, which include 36 warehouses.

The railway system of Uruguay has been developed with Montevideo as its focus, and nearly all of the ocean commerce of

¹ For an appreciative, well-illustrated article on Montevideo, see Montevideo, the City of Roses, by Edward Albes in *Bulletin of the Pan-American Union*, October, 1917, pp. 435-463.

the country passes through that port. It is a fine, attractive city with modern improvements but is much less hustling and extravagant than Buenos Aires. The small development of manufacturing which has taken place in Uruguay is mainly confined to Montevideo and is most largely connected with the preparation of meat products. There are about 100 flour mills, large and small, in the country.

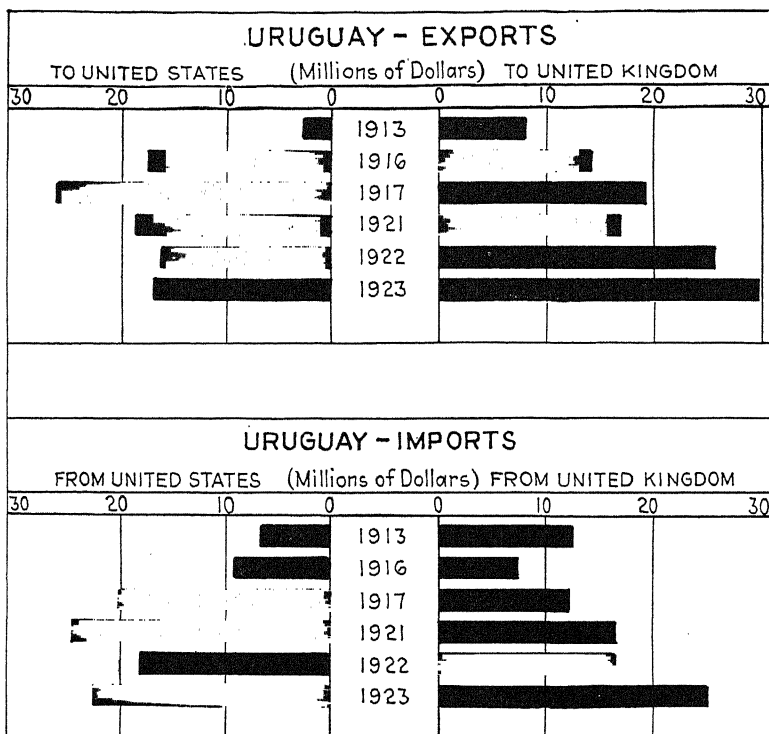


FIG. 141.

Foreign Commerce.—In proportion to its population, Uruguay is a wealthy country. Poverty is little known, and the per capita exports of the country frequently reach \$75 annually, which is very high; 95 per cent of these exports are animal products. Twenty to twenty-five per cent of them go to the United States, but a still larger proportion goes to the United Kingdom. A country that sells much abroad has a large purchasing power, and, hence, may support a large import trade. This is notably

true of Uruguay, whose 1.6 million people use more imported goods than Peru's 6 million. This difference is largely due to the fact that most of the people of Uruguay are of European stock, while the majority in Peru are Indians. The annual value of exports—75 to 100 million dollars—is usually greater than that of imports, giving a favorable balance of trade. This is essential to the financial stability of the nation, which has a large foreign debt; 40 per cent of the revenues of the country are required for interest on the national debt. The credit of the country and its financial record are, however, among the best in Latin America. Its imports are mainly manufactured products bought from Europe and the United States. Trade between the United States and Uruguay is now much larger than it was before the World War.

The Seal Fisheries.—On the Atlantic coast of Uruguay, near the port of Moldonado, are several small islands upon which seals collect in considerable numbers. For about a century, sealing has been carried on here in a wasteful way. As many as 24,000 seal skins have been reported in a year as taken from these islands, but the destructive methods followed by the sealers have greatly reduced the number of seals, and the value of the skins now obtained is not an important item.

SUMMARY

Man's Adjustment to His Environment in Uruguay.—Uruguay is an arbitrarily determined political unit, in spite of the fact that most of its boundaries are natural. It might very well have been a state of Brazil or a province of Argentina; but it possessed just enough geographical separateness from either of these countries to engender in the people of the Banda Oriental a persistent demand for independence. In a similar way, the Province of Buenos Aires in Argentina also struggled hard for independence, but failed to get it, partly because there was absent that degree of separateness from the rest of Argentina that would justify independence.

Man's economic adjustment to his environment in any region is influenced both by the environment itself and by the stage of progress in which he then is. Once the Argentine Pampa was almost exclusively devoted to grazing, as Uruguay is now.

An important non-geographical influence determining men's occupations arises from the habits, fashions, and customs of a

people. If custom and tradition, long established, decree that the men who own large landed estates are the gentry of the nation, then men will seek to own land. If population is sparse, the only way that these large tracts of land can be used profitably is to devote them to grazing. If custom or tradition places something of a stigma upon the man who works the soil but honors the man who sits on horseback, rides over his broad acres, and views his grazing flocks and herds, then men will seek the latter type of life. Even economic motives will only very slowly modify the national habits. They are changing in the Argentine Pampa a little more rapidly than they are in Uruguay because more agricultural immigrants are going there. The absence of coal and the youthful economic stage, in which Uruguay now is, have prevented any considerable development of manufacturing and have kept the country in the condition of an exporter of products of the ranch and an importer of manufactured goods. This is probably the truest economy for the nation, for the Uruguayan market is too small to permit of large-scale production of manufactures, which is the only economical system for making the more complex types of manufactured products.

PARAGUAY

Historical Background.—Geographically, there is no adequate reason for the existence of an independent country in the area occupied by Paraguay. Its territory should have been part of the adjoining countries which touch the sea. It is a case of historical causes prevailing over geographical and leading to the establishment of a separate country where none should have been. After a country has been established and a sense of nationality has been developed in its people, the country's right to exist as an independent nation must be accepted, however badly it may be handicapped by its unfavorable situation and boundaries.

The navigator, Sebastian Cabot, sailed up the Paraná-Paraguay in 1527, nearly a century before the landing of the Pilgrims in Massachusetts; and a later explorer founded the city of Asuncion in 1535. Thus did this city, 1,000 miles up the river from the Atlantic, begin its existence ahead of Buenos Aires, Rio de Janeiro, or Montevideo, the outstanding port cities of South America.

An important reason for navigating this waterway so far inland and for locating settlements there was the desire of the

Spaniards to establish a route to the famous silver mines of Potosi in the present Bolivia. To reach these mines by the route which led across the Isthmus of Panama, down the west coast of South America, and across the lofty Andes in their widest and most difficult part was an exceedingly long journey. Moreover, that route led through the Caribbean Sea, which was infested by buccaneers. The eastern and southern route from Spain to the River Plate, up the Paraná-Paraguay, and overland to Potosi was somewhat easier and less dangerous. Thus was the nucleus of the future Paraguay planted in the interior of South America on the route to the silver mines of Upper Peru (Bolivia).

In 1811, the Paraguayans revolted against Spanish rule and set up an independent nation as the other Spanish colonies in America were doing. Three dictators in succession ruled the country until 1870. During the last five years of this period, the last dictator, Francisco Lopez, involved his country in the most terrible war South America has ever had. In this struggle, Lopez and the Paraguayans fought Brazil, Argentina, and Uruguay until almost every male who was able to bear arms in Paraguay had been killed. Of the Paraguayan population of 1,300,000 in 1864, only 220,000 remained in 1870, and of these only 28,700 were men. The losses of men and land reduced Paraguay to the present position of impotency which it occupies.

Physical Character of the Country.—Paraguay is one of two countries of South America that do not possess the geographical advantage of frontage on the sea. The boundary between Bolivia and Paraguay is still unsettled, and a large area lying between the two countries is still in dispute (Fig. 4). This disputed region has few people, partly because no assured land titles can be given until the national ownership of the land is legally determined. In making maps of this region, it is customary to divide the disputed area by a diagonal boundary line, assigning part of the region to Bolivia and part to Paraguay and giving the latter country an area of about 100,000 square miles and a population of 800,000 to 1,000,000. This makes Paraguay the smallest country but one in point of area in South America, and the smallest in population (not considering the colonies of Guiana). The little country consists of two distinct regions. "The River Paraguay divides the country into two quite distinct areas. In fact, it is doubtful if any river in the world forms the

boundary line between two regions so different in almost every respect—topography, soil, plants, people, and industries.”¹

Most of the people and towns, including Asuncion, the capital, and most of the economic development are found in a narrow belt parallel to the river on the eastern bank (Fig. 142). The part of eastern Paraguay which slopes toward the Paraguay River is a region of low plains, in part poorly drained and less than half

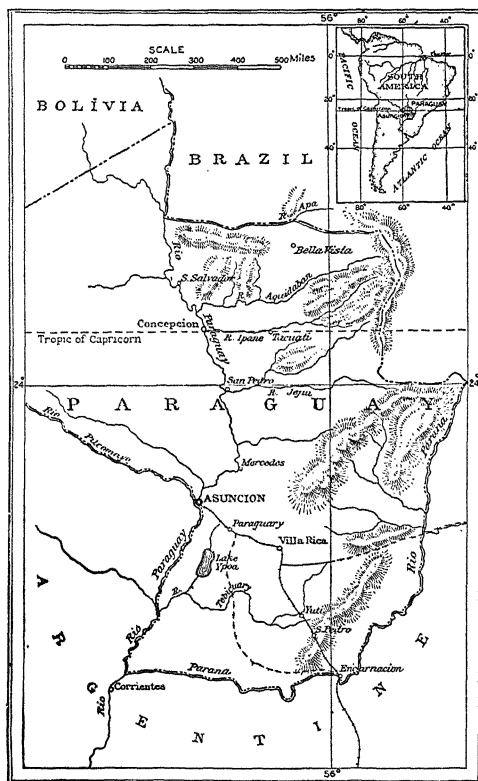


FIG. 142.—Sketch map of Paraguay. (Pan-Am. Union.)

forest covered. It includes most of the cultivated lands of the republic, although only a small portion is under cultivation. North and south through eastern Paraguay runs the low divide which separates the drainage of the upper Paraná from that of the Paraguay. The lands sloping toward the Paraná are more

¹SCHURZ, W. L. Paraguay: A Commercial Handbook, *Special Agents Series* 199, U. S. Dept. of Com., Washington, D. C., 1920.

than 80 per cent forested, including the principal yerba forests and yerba estates of the country. This eastward slope is a wilderness, subtropical in climate, uncrossed by any railway, and possessed of no city or town of any size. Its main outlet is by way of the rivers of the Paraná system by which the yerba and a few minor products ultimately reach Buenos Aires.

The portion of the republic lying west of the Paraguay River belongs to the wide sweep of undulating plains known as the Chaco, which also include parts of Argentina and Bolivia. The Paraguayan Chaco is only partially explored. It is of very little economic importance except for a little cattle raising and small quantities of quebracho taken from the scattered forests. It is believed, however, that it may have future possibilities for cattle raising.

The rainfall ranges from 35 inches in the Chaco, where damaging droughts sometimes occur, to 60 inches in the forest region of the east. The temperatures are tropical and semi-tropical but are subject to the wide variations which characterize the interiors of continents. It is, by no means, the sort of country that can offer many attractions to European immigrants. Much more attractive lands lying nearer the sea are still available in South America.

The Character of the Population.—During the long and bitter war against the triple alliance composed of Argentina, Brazil, and Uruguay, the Paraguayans displayed a perseverance and hardihood seldom exceeded, but the war left the country depleted of men, and that depletion has scarcely yet been made good.

The Guaraní Indians, a group of agricultural tribes that occupied this part of South America, form a large element in the racial stock of Paraguay. Only a minor fraction of the people are pure Indians, but an even smaller fraction are pure whites. It is essentially a mestizo race, formed by the fusion of Spaniards and Indians, together with a small but influential element of pure Spanish and other European immigrants that came in since 1870. While the official and literary language of the country is Spanish, the language of the common people is Guaraní, and this is one of the factors which hold the nation back. Another factor is the isolation of the country and its lack of immediate contact with the more advanced parts of neighboring nations. A somewhat enervating climate, and a too-free use of native rum are further retarding factors in the backwardness of the nation. Only a

minor fraction of the children have the opportunity of attending school, and at least two-thirds of the population cannot read and write. The national University at Asuncion has a few hundred students. Almost the entire population lives by crude agriculture, stock raising, and the forest industries. The plane of living is low, except among the leading families in a few cities. It is estimated that the 800,000 people (more or less) have the purchasing power of an American city of 150,000.

Agriculture.—The poorest soil of any of the larger divisions of Paraguay is found in the Chaco. Of the section lying east of the Paraguay River and tributary to it, upwards of one-fourth is swampy, but the better-drained portions form the agricultural

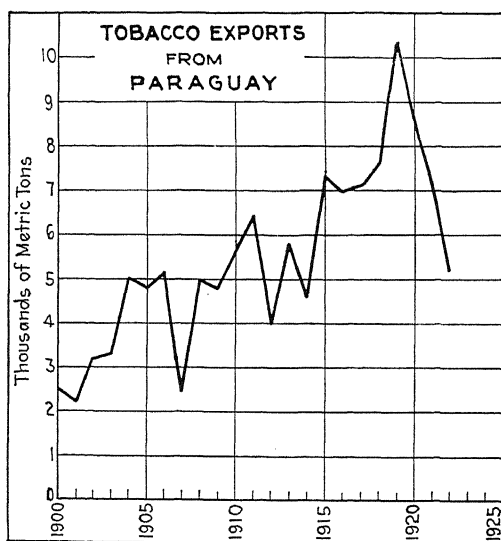


FIG. 143.

lands of the country. They consist of the fertile red soil so common in this part of South America. The soil of the forest lands of the Paraná basin is the best in Paraguay, but practically none of it is cleared and devoted to agriculture.

Tobacco, grown on some 2,500 acres, is the leading commercial crop, and constitutes about two-thirds of the value of all agricultural exports of the country. The production is increasing, but the methods of growing and curing are primitive, and the product is inferior. The total production of some 16 million pounds yearly is equal to that of Halifax County, Virginia.

Sugar cane is one of the most promising crops. The acreage is small, and the industry is dominated by a few producers, one of whom grinds more than half the cane of the country. The total production would be about 1 month's work for a large Cuban sugar mill.

Cotton yields well, but very little is grown, partly because of lack of machinery for ginning and manufacturing.

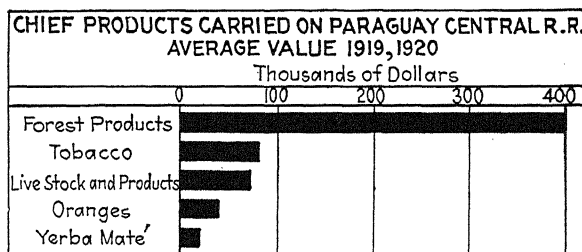


FIG. 144.—Chief commercial products of Paraguay.

Rice, one of the chief items of the national diet, is grown on the lowlands by primitive methods and is threshed by driving oxen or mules over the straw. The quantity grown is much below the requirements of the country.

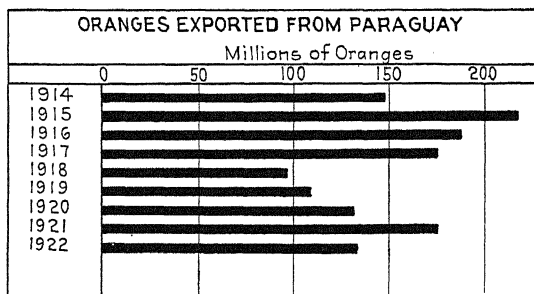


FIG. 145.—In Paraguay, oranges grow almost wild. They are abundant and cheap. Exports go to Argentina and Uruguay.

Corn (maize) is grown on nearly every farm and occupies the largest area of any crop; yet, even this area is equal only to about one medium-sized county in the United States.

Manioc or mandioca, which is extensively grown in Brazil, is raised throughout Paraguay, but almost wholly for local use. The yield per acre is large, and the forms in which it may be used

are numerous. It constitutes the bread and potatoes of the nation.

Oranges are the characteristic fruit of Paraguay, growing without attention, and spreading even into the forests. It is doubtful if any other part of the world is so perfectly suited to the growth of this fruit. So cheap and common are oranges that little value is placed upon them, and about the only external market to which they can be sent is Argentina and Uruguay. The industry is poorly managed, and the crop yields little profit to the grower because of high freight rates and high marketing costs.

Importation of Foodstuffs.—A commentary on the backwardness of agriculture in Paraguay is seen in the fact that this warm and fertile country does not produce enough food for its own people and imports considerable quantities from outside.

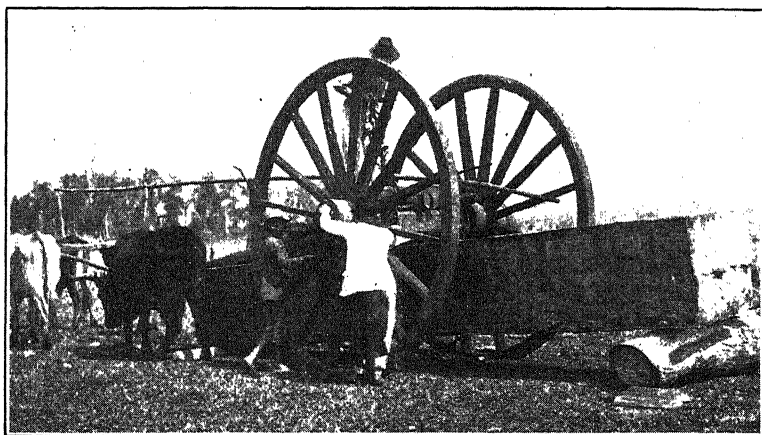
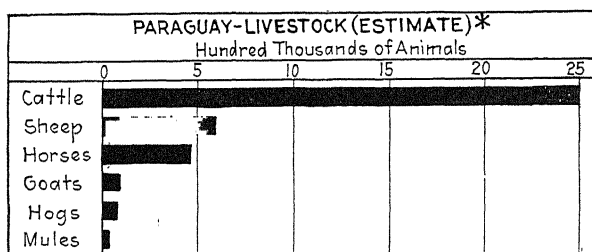


FIG. 146.—Moving timber in Paraguay.

Cattle Raising.—It is estimated that there are four times as many cattle as people in Paraguay. The native cattle, descended from Spanish stock introduced long ago, have degenerated. Some of the Indian zebu type from Brazil have been brought in; but while they are more disease-resistant than other cattle, they make poor beef, for their meat is tough and lacking in fat. The more progressive cattle companies have introduced foreign pure-bred cattle, especially Herefords, and have improved the stock on their estancias. One of the largest of these companies owns a tract of $1\frac{1}{4}$ million acres and keeps 150,000 cattle. In certain respects, this section of South America, including adjacent parts of Brazil,

holds out considerable promise of providing increasingly for the world's future supply of meat: (1) the land is very cheap; (2) the climate is mild, and no shelter or winter feeding need be provided, for the cattle graze the year around; (3) taxation is so low that it is nearly negligible; and (4) the civilized Indians and half-breeds take readily to cattle herding. The chief difficulties are the pests and diseases which are more troublesome in a warm climate than in a cool one; and the remoteness and isolation of the country. The three American meat-packing plants that were erected in Paraguay during the World War have closed. A few of the large cattle-raising companies have made excellent profits and have shown that under enlightened business management, cattle raising in Paraguay may be profitable.



* U.S. Commerce Rept. July 22, 1920

FIG. 147.—Paraguay has very extensive cattle pastures and large herds of cattle.

Agricultural Colonies.—Paraguay needs immigrants; but its geographical remoteness and general unattractiveness when compared with Argentina, Uruguay, or southern Brazil have prevented its securing any considerable number of immigrants. Considering its poverty of national revenues, Paraguay cannot compete with these more favored lands in the inducements offered to settlers. If, therefore, it is to secure immigrants, some exceptional device has to be adopted. One of these devices is the agricultural colony of which there are two types: one, the national colony and the other, the private colony. Both government lands and the private lands are subdivided into small farms, and by means of agents, propaganda, and advertising, an effort is made to induce colonies of immigrants to settle on these lands and improve them. Unfortunately, the promises held out are usually too optimistic, and the colonists find the realities far below their expectations and become dissatisfied. Most of these colonies have either failed or are maintaining a precarious

existence. A small minority of the people have attained reasonable success.

Efforts of this general sort are being made in other parts of South America—efforts of land companies or other private interests to induce people to go into out-of-the-way lands and to subject themselves to deprivations and hardships in an effort to develop a remote region before the time for doing so is ripe. Efforts to establish colonies in the Montaña of Peru and Bolivia, efforts to get people to develop Alaska, and even some of the irrigation projects in the United States, Canada, and Brazil represent this misguided effort to develop, at heavy cost of labor, privation, or money, certain parts of the world which are not yet needed; not needed because better-located and more fertile lands are lying unused or half used. These forced and premature efforts of development companies have brought hardships and disappointments to large numbers of people.

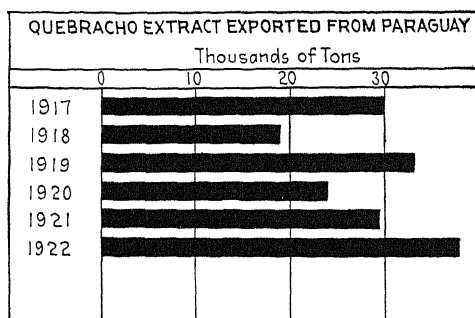


FIG. 148.—The quebracho forests of Paraguay are less important producers than those of Argentina.

Foreign Commerce.—The foreign trade of Paraguay is small, the smallest of any of the South American countries. Paraguay has practically nothing to sell except the products of the land, which are three general groups: (1) animal products; (2) forest products—mainly yerba, quebracho, and a little timber; and (3) agricultural products, of which tobacco forms the leading item. These three groups supply over 96 per cent of the exports of the country. The imports are diversified, but foodstuffs and textiles form 60 per cent of the total. Manufactured goods, of course, constitute most of the imports, for Paraguay has almost no general manufacturing except that done in small shops which make simple articles for local use.

Only one railway reaches into the country, and most of the dependence for transportation must be placed upon the rivers, whose importance to the economic life of the country is discussed on page 209. The country has practically no good roads.

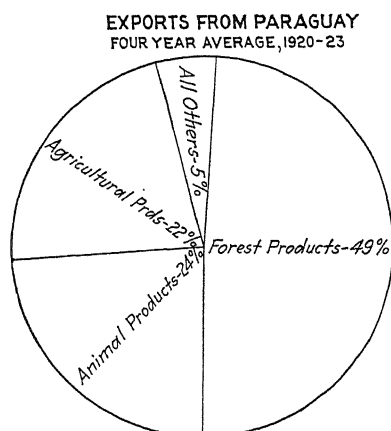


FIG. 149.

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CHAPTER XIV

BRAZIL: THE COUNTRY AS A WHOLE AND ITS SOUTHERN REGIONS

Significant Geographical Features.—Brazil is the largest of South American countries; it constitutes 45 per cent of the area of the continent. In size, it exceeds the United States without Alaska, and is nearly three times as large as Argentina. Unlike the Spanish colonies, which split up into many nations, this Portuguese colony remained intact after it separated from the mother country, and it now holds nearly half the population of the continent under one government.

The second geographical fact of large importance is the location of most of the country within the tropics. Tropical climates have both advantages and disadvantages; but so far as white people are concerned, the disadvantages predominate. The greater part of Brazil is still undeveloped and very sparsely peopled, mainly because of the direct and indirect consequences of the climate.

The third significant geographical fact is the presence in eastern Brazil of an extensive highland. This provides an area as large as the British Isles, France, and Germany combined, where the elevation of the land reduces the tropical heat. The plateau occupies nearly one-quarter of Brazil and lies near the sea. Its surface is hilly, and in places mountainous, but most of it can be used for crops or pasturage. It is, by all odds, the most important feature of the country.

Brazil divides naturally into three main physical regions: (1) the eastern highland or plateau already mentioned, (2) the basin of the Amazon River, low in elevation, hot at all seasons, deluged with tropical downpours, and partly covered with dense forests; (3) the southern interior, largely, but not wholly, lowland, which consists more of grass lands than of forests and lies mainly in the drainage basin of the Paraná-Paraguay River system. The eastern plateau region may be divided into northern, middle, and southern sections on the basis of climate and productions. Along

the sea for over 1,000 miles, the eastern escarpment of this plateau rises almost from the shore. Its seaward edge appears like a range of mountains and has been named the Serra do Mar. So steep is this escarpment that it is with great difficulty that two standard-gage railways have surmounted the grades, and one of these is able to make the ascent only by the use of cables. The railroad that runs north from Rio de Janeiro through Petropolis



FIG. 150.—Relief map of Brazil. *From model by Howell. Copyright 1899 by the Macmillan Co. (Reprinted by Permission.)*

uses rack and pinion to ascend the steep slopes. A coastal plain of considerable width is found north of the seventeenth parallel, and on this plain are the two large cities of Bahia and Pernambuco.

The highland of eastern Brazil is the redeeming physical feature of the country. Its surface averages about 2,500 feet in elevation and is surmounted by ranges rising to 8,000 feet. Since every thousand feet of elevation reduces the average tem-

perature about 3°F., the surface of this highland is 7 or 8 degrees cooler than it would be if the region were a low plain. The southern half of the highland is fairly cool much of the year, and the white people who live there are energetic and enterprising.

Throughout most of Brazil, rainfall is ample for crops except in the northeast, where sheltered valleys between ridges are shut off from the rain-bearing winds and frequently suffer from serious droughts (Fig. 7). Extensive and costly irrigation works are being installed there. The eastern plateau may be divided into



FIG. 151.

northern, central, and southern sections (Fig. 151). The former is distinctly tropical in character, and a large majority of people have negro blood. The farther south one goes, the fewer negroes he finds. The race seems to prefer hot lands. This northern section is agricultural. Four staple crops are produced, sugar, cacao, cotton, and tobacco, although these crops are not all confined to this section. The central section is somewhat milder in temperature and is the most advanced part of Brazil. It includes three of the leading states: São Paulo, the great coffee-producing state; Minas Geraes, the mineral-bearing state; and

Rio de Janeiro, in which the capital is located. The southern section lies south of the Tropic of Capricorn and has a warm temperate climate. It is only partially developed but contains the progressive state of Rio Grande do Sul with its many cattle, swine, and sheep, and the state of Paraná with its pine forests and yerba groves.

In this eastern highland and on its coast live over 90 per cent of the people of the country. The only large city of Brazil that is not thus located is Pará, the ocean gate for the Amazon Valley. Between the eastern plateau and the great lowland interior, there is very little intercommunication. Most of the navigable rivers flow, not toward the coast, but toward the Amazon, and only one railway entirely crosses the plateau and the southern interior (Fig. 177). It is to be noted that the highland section of eastern Brazil is as large as Argentina, and that the part of this highland

PROPORTIONS OF LAND USED AND NOT USED FOR FARMS		
Land Not Used For Farms - 79.5%	Land in Farms 20.5 %	Woodland 5.8%

FIG. 152.—Only about 20 per cent of the land of Brazil is in farms.

well suited to agriculture is larger than the Argentine Pampa. With all of Brazil's waste land, it still has a very large area of well-located farm land where whites may live. Yet, it is a significant fact that two-thirds of the area of Brazil is unoccupied except by Indian tribes and occasional small settlements which contain a few whites. Vast areas are virtually unknown even to the Brazilians themselves. The great extent of undeveloped country is one of the most impressive facts in the geography of Brazil.

Land Utilization.—Brazil has somewhat more than 2 billion acres of land, about 80 per cent of which is not occupied as farm lands. The 20 per cent that is included in the 650,000 farms would make 10 states the size of Illinois or 10 countries the size of England. Of this area, fully 75 per cent is pasture and brush land, and 6 per cent is covered with forest. Thus, the land actually cultivated is less than the area of two states like Illinois. There are many large estates, but the average size of farms is 660 acres, or nearly five times the average size in the United States.

On the whole, farm land is relatively cheap in Brazil, though it doubled in value between 1910 and 1920. In the latter year, the official census placed the value of the 400 million acres of farm land at about 3 billion dollars or \$7.50 per acre. Nearly all of the cultivated land lies relatively near the coast, usually within 400 miles.

The agricultural lands may be divided into (1) the hot lands of the north, including such important states as Bahia and Pernam-

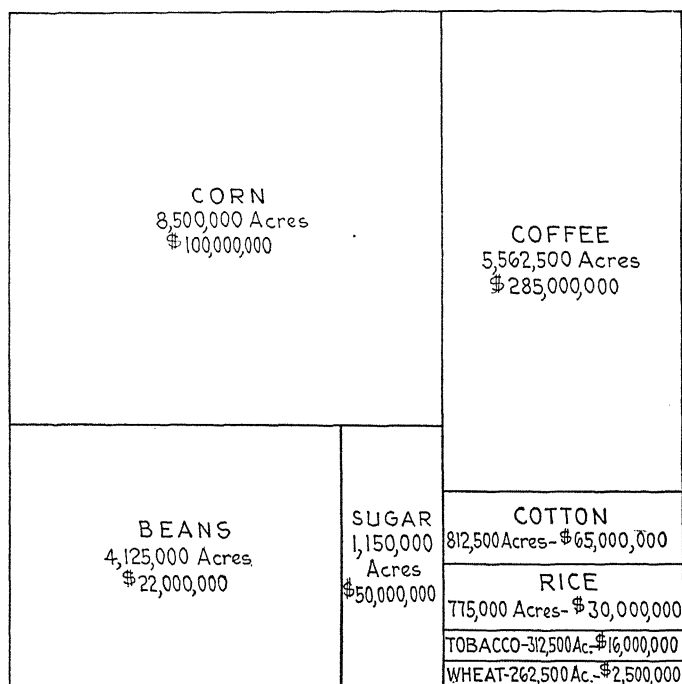


FIG. 153.—Relative proportions of the cultivated land of Brazil devoted to various crops. Both areas and values are only approximate averages.

buco (Fig. 154); (2) the mild tropical, including the two leading states of Minas Geraes and São Paulo; and (3) the warm temperate, composed of Paraná, Santa Catherina, and Rio Grande do Sul. Even São Paulo and southern Minas Geraes might be considered as warm temperate because of the altitude of most of their land. The two large interior states of Matto Grosso and Goyaz contain extensive grass lands, but very little cultivated land. There is practically no cultivation north of the Amazon

and not much anywhere in the vast Amazon lowland, which is deluged with rains, partially flooded in the rainy season, and quite too sultry in temperature to attract settlers.

An outstanding thing about Brazil is its enormous area of land capable of growing the products of commerce in almost unlimited quantities, and the exceedingly small area of the country ($3\frac{1}{2}$ per cent) that is actually cultivated. It is also worthy of note that 64 per cent of the value of all agricultural property is found in three states, São Paulo (27 per cent), Rio Grande do Sul (19 per cent), and Minas Geraes (18 per cent). The great producing capacity of the best of this land may be judged from the fact that all the coffee of Brazil, which is two-thirds of the world's supply, is grown on 5 million acres, or one-fourth of the area of a state like Indiana, or one-fourteenth of the area of São Paulo.

The comments of Lord Bryce,¹ one of the most competent and kindly of observers, are of interest in this connection:

"Taking Brazil as a whole, no great country in the world, owned by a European race, possesses so large a proportion of land available for the support of human life and productive industry. In the United States there are deserts, and of the gigantic Russian Empire much is desert and much is frozen waste. But on the Portuguese of Brazil nature has bestowed nothing for which man cannot find a use . . . The material prosperity of a country, however, depends less on its natural resources than on the quality of the labor applied to its development and on the intelligence that directs that labor. In these respects Brazil has been less fortunate."

The People of Brazil.—For three centuries, Brazil was a Portuguese colony, and its eastern portion was settled by immigrants from Portugal. Many of the distinguished families of the present are descended from the Brazilian nobility and gentry of the days when Brazil was an empire, ruled by a royal family of Portuguese origin. In fact, the king and court of Portugal resided in Brazil during a part of the Napoleonic period. The language of the country is Portuguese; the traditions, ideals, and social and political standards are inherited from Portugal, as those of the United States are inherited from Great Britain. Both peoples, of course, have been steadily modified in the New World.

The same demand for plantation labor that brought negro slavery into the southern United States brought it into Brazil,

¹ South America, *Observations and Impressions*, p. 404, New York, 1912.

and slavery was finally abolished in Brazil only in 1888. Many slaves had been freed, however, before this. The Brazilians have no such race feeling toward colored people as the North Americans have. They pride themselves upon the fact that there is no color line in Brazil. So far as color is concerned, whites, mulattoes, and blacks may attend the same schools, ride in the same cars, and attend the same social gatherings. In actual practice, very few colored people become sufficiently wealthy to

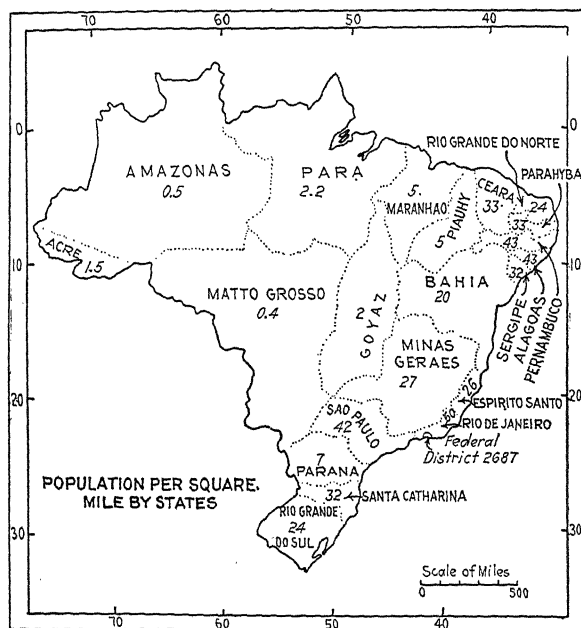


FIG. 154.—Only in the eastern highland states is the population of Brazil at all dense.

move in the upper circles of Brazilian society. However, a man having negro blood in his veins may rise to the higher political offices if he is otherwise acceptable.

In Brazil, as in all Latin America, there is a very strong feeling that a gentleman must not do manual work, even of the lightest kind. This caste attitude is breaking down somewhat in those sections into which have come white immigrants who do manual labor. But, when these immigrants rise in the economic scale and become well to do, as is frequently the case, they tend to adopt the traditions of the country and to look down upon the

man who works. In any country where colored people do most of the manual labor, this attitude of mind on the part of the upper class is sure to develop.

There are no reliable statistics on the proportion of whites, mulattoes, and blacks in Brazil. In the north, people who have negro and Indian blood are greatly in the majority. In the states from Rio de Janeiro southward, people who are wholly white or nearly white predominate. In the interior, the sparse population is mainly Indian, or a mixture of Indian and white, with a possible further mixture of negro blood. The Brazilian census figures are inaccurate and indiscriminating with respect to the makeup of the population and they cast little light on the true racial composition. The absence of a social color line facilitates the intermarriage of all types and mixtures, and the trend must inevitably be in the direction of a fusion of racial elements into a Brazilian people of mixed ancestry.

The vast majority of the colored people are poor, illiterate, unambitious, and inefficient as laborers. Eighty per cent of the total population is said to be unable to read and write. In the northern states, where negroes predominate, their unsanitary mode of life makes them easy victims of tropical diseases, which still further reduce their vitality and cause a high death rate. A close observer and cautious writer thus describes the negroes of Brazil:

"The negro is indolent; work inspires him with a profound horror; he will allow himself to be driven to it only by hunger or by thirst; when all toher resources fail him, then only he presents himself at the morning roll call and offers his services . . . Taking them all in all, the negroes in the sugar-producing regions like Minas form a type of laborer of very indifferent economic value . . . To sum up: the moral and economic inferiority of the negro populations of Brazil is incontestable. The puerility of the negroes is extreme. They have no foresight, and are innocent of any form of ambition, the sole motive power of progress . . . Alcoholism is not the only plague of the negro population. It is the prey of other maladies which are bred by the utter lack of hygiene."¹

In the southern half of the highland area and conspicuously in the region of São Paulo, European immigrants are numerous, and a much higher degree of energy is evident. The future progress

¹ DENIS, PIERRE, *Brazil*, pp. 319, 322, 325, New York, 1911.

of Brazil depends much upon the spread of these European peoples over the highland states and the gradual domination of the economic life of the country by them. The immigrants are mainly Italians, Portuguese, and Spaniards; but Germans, Slavs, and other Europeans and some Asiatics are included. An earlier German immigration into the south has given rise to several distinctly German sections where the German language and German customs still prevail. The Italians are most numerous in the State of São Paulo where many are employed on the coffee estates. Although several Brazilian states have actively assisted immigrants to reach those states, the arrivals averaged only 40,000 a year for several years following the World War, as against 100,000 before. European immigrants are slow to enter countries where there are large numbers of colored laborers with whom they must compete. Very low wages and a very low plane of living exist among the laborers of Brazil, and the whole economic life of the nation suffers because of these.

The upper class of Brazilians are refined, accomplished, and socially charming. They travel extensively, send their sons to universities, and maintain brilliant social circles in the chief cities. They are fond of political office, love oratory, and patronize art, and many of them succeed in business undertakings, especially in coffee growing. As a people, however, the Brazilians do not take to business, industrial enterprises, and practical occupations with any such keen relish as do the people of the United States, Canada, Great Britain, or Germany. This is due partly to differences in climate and partly to differences in inherited attitudes of mind. The educated Brazilians lean more toward the fine arts than toward the mechanical arts, and more toward genteel leisure than toward engrossment in business. The vast expenditures on the beautifying of the water front of Rio de Janeiro, on the magnificent opera houses of São Paulo and Rio de Janeiro, and on the made-to-order capital city of Bello Horizonte in Minas Geraes are examples of the ways in which Brazilian leaders love to spend public money. At the same time, there are not schools for half of the children, and there is little interest in the education of the lower three-fourths of the people. Extravagance and looseness in public expenditures have burdened Brazil with a public debt that has steadily increased in times of peace and has threatened the financial stability of the republic.

THE SOUTHERN LOWLAND AND PLATEAU

Character of the Region.—The southern interior of Brazil has been briefly discussed on page 207 in connection with the Paraná-Paraguay basin. It is partly a tropical lowland plain but includes also the low plateau of Matto Grosso. So far as natural vegetation goes, upwards of two-thirds of the region is grass land with patches of scrub scattered through it (Fig. 10). Less than one-third is forest land. The rainfall is fairly abundant (50 to 60 inches) with a distinct dry season from May to September (Fig. 8). There is much swamp land, and the chief use that is made of the region is for the pasturing of cattle. Cattle ranches of great extent exist; even the average size of fazendas (farms or estates) in this region is over 5,000 acres.

The greater part of this southern interior is included in the State of Matto Grosso, which is five and one-half times the size of England but has only 250,000 people. This great interior state has no convenient outlet to the sea. The Paraná River southward to Buenos Aires is of some use, but it has many limitations. The poorly maintained single-track railroad to São Paulo serves only a small section in the extreme south. Both of these routes are slow, the rates are high, and most of Matto Grosso is not within hundreds of miles of either. The cattle that reach outer markets are driven long distances—hundreds of miles—and many of them are later pastured in the fattening grounds of São Paulo and Minas Geraes.

The greater part of the State of Goyaz (288,000 square miles) also belongs to this region. This state, too, has made little progress in economic development and has only a half-million people, or less than the single city of São Paulo. In Goyaz, the Brazilian government has set aside an area for a Federal District and future capital. At present, this area is part of a wilderness into which no railroad penetrates.

Owing to the remoteness of this interior section and to its tropical climate, population has been slow in entering, and the density is only one person to the square mile. Agricultural crops, if raised, cannot be shipped to the distant markets of the east or south, for the cost is nearly prohibitive. Only 3 per cent of the farms of Brazil are in this interior region. The manganese deposits are of potential value but cannot pay the high cost of shipment except at times of great demand, such as the World War.

The forests of pine and the included groves of yerba maté are mainly in states that border on the ocean, and are treated in the section dealing with southeastern Brazil.

Almost the only product of this remote section that can be raised and marketed at a profit is cattle. They can be driven to market at relatively low cost. They are not high-grade animals, for the better European cattle easily become victims of the fever-carrying cattle tick which abounds in this warm climate. There is reason for believing, however, that Matto Grosso and Goyaz will some day be great cattle-producing states.

An American geographer¹ who is especially familiar with Brazil thus writes of this region:

"It is very striking that in this age of mobilization of resources such a large area should be so little known, and even in large part under the control of the Indian, with almost no expanding frontier encroaching. The reason is not a lack of available resources or extremely adverse climatic and physiographic conditions as might be presumed, but it is due, chiefly if not wholly, to the fact that there is no good natural outlet for the products of the region to reach a world market. This fact has kept its resources locked up and this part almost completely isolated from the other more favored sections. The size and latent possibilities of this great undeveloped region have had, therefore, little part in the economic development of Brazil. Its very bigness has been a handicap, and to bring this great region with its rich but undeveloped resources in touch with other sections and with the outside world is the great problem for the country as a whole."

BRAZIL SOUTH OF THE TROPIC

Physical Features and Agricultural Development of the Region.—The Tropic of Capricorn passes through the southern part of the State of São Paulo, close to the city of São Paulo. Hence, only a small corner of this state is in the temperate, or intermediate, zone. The states of Rio Grande do Sul and Santa Catharina and nearly all of the State of Paraná are in this zone; they correspond in latitude to our states of Florida and Georgia. The plateau of eastern Brazil extends through Paraná, Santa Catharina, and part of Rio Grande do Sul, and its elevation somewhat reduces their average temperature. The former two of these states originally were 80 per cent forest covered, and the larger part of their land is still in forests or in recently cut-over

¹ HAAS, WILLIAM H., *Jour. of Geog.*, vol. 24, p. 84, March, 1925.

land. The State of Rio Grande do Sul represents a transition between the forest section of the north with its heavier summer rainfall, and the grass lands of Uruguay, where the summer rains are uncertain.

This southward-protruding tongue of Brazil is a land of achievement and of promise. Already Rio Grande do Sul is one of the leading states of the republic in energy, wealth, manufacturing, and general development. In the middle of the last century, large numbers of German farmers entered the region and have prospered. In many communities, German is the language in common use. These settlements have been so thoroughly German in their leanings that they have given trouble to the Brazilian federal government, and insurrections have been quelled by force of arms. In this region are the pine forests and the yerba groves which give rise to two of the most important forest industries of Brazil (Fig. 10). Two of the states are important for corn and swine. Rio Grande do Sul is the only Brazilian state that makes a business of wheat raising. It is second only to Bahia in the production of tobacco and is the leader in rice and grapes. In this single state with its moderate temperatures and extensive grass lands are found one-fourth of the cattle and three-fifths of the sheep of Brazil (Fig. 102). The population of these three states is almost entirely of European descent. Rio Grande do Sul has more people than the republic of Uruguay, and twice as many as Paraguay. In the states of Rio Grande do Sul and Santa Catharina are the only coal mines operating in Brazil. The extreme southeastern section is second only to the eastern section of Brazil in economic importance.

Notable Increase in the Production of Rice.—Rice is a common food among the working people of Brazil. Formerly, a large part of the rice was imported, but an import tax was imposed, and the country now produces about 30 million bushels a year, or nearly 1 bushel per capita. This is more than enough for the home requirements and a small surplus is exported. The crop is raised in every state in the republic, but the regions of most intensive cultivation are the coastal lowlands of the states of São Paulo and especially of Rio Grande do Sul where water for flooding is abundant. A great deal of upland rice is grown, especially in São Paulo and Minas Geraes. These three states produce 75 per cent of the total rice crop of the nation, which is several times as great as its wheat crop. The rice is raised in small fields by

rather crude methods. The yield is usually below 20 bushels an acre, contrasted with about 60 bushels in California. The quantity of rice grown in Brazil is only a fraction of what could be grown, for in the lowlands of the Amazon system of rivers, there are millions of acres of land suited to rice production. For purposes of comparison, it may be pointed out that Brazil produces nearly as much rice as the United States, but only one-fortieth as much as India.

LIVE-STOCK AND MEAT INDUSTRIES

Cattle.—Since the best cattle lands are in southern Brazil, the cattle industry as a whole is treated here. In all the less tropical parts of the country, large numbers of cattle are raised. These cattle lands are mainly (1) in the cooler southern states, or (2) on the highlands of Minas Geraes and São Paulo. In both of these sections, the heat is moderate, grass lands are abundant and relatively cheap, and railway transportation is good. In the interior are grass lands where cattle are cheaply raised. As already indicated, cattle raising is the most suitable industry for this remote region. The cattle from the interior are driven long distances and reach the fattening grounds of São Paulo and Minas Geraes in a lean condition, and are here pastured for 8 to 12 months to bring them into fit condition for slaughter. Figure 102 shows the distribution of the 34 million cattle of Brazil: about 25 per cent are in Rio Grande do Sul and 22 per cent in Minas Geraes.

Three Periods of Cattle Raising in Brazil.—In almost any country where grass lands are abundant and population is relatively sparse, cattle and sheep raising is an economic adaptation. During the early colonial days, the Portuguese brought European cattle into Brazil. Little attention was paid to improving the breeds, and the animals deteriorated to a lank, bony type. With the development of the tropical plantations worked by great numbers of slaves, the second period of the cattle and meat industry followed. In this period, large numbers of lean cattle were killed, and the meat was dried and slated as *xarque*, or jerked beef. The industry began in southern Brazil as early as 1798. This cheap meat has always found its chief market among the colored laborers of the northeast, and only a small proportion has been exported. During the latter part of this period, which extends down to 1914, an effort was made to improve the native

cattle by importing the East Indian humped cow known as the zebu. This animal, accustomed to warm climates, proved adaptable to Brazil, and at present, a very large proportion of the cattle in the warmer parts of the country have zebu blood. They are not, however, good beef cattle, as judged by European standards, and their meat does not sell well in north European markets.

The marked success of Argentina in improving its cattle by the importation of pure-bred animals and the subsequent development of the exportation of high-grade beef have initiated similar movements on a smaller scale in Brazil. During the World War, modern slaughtering and meat-packing plants were established in southern and eastern Brazil. This step brought in the third period in the cattle industry, namely, the present period of improved breeds of cattle and refrigerated beef. In this evolution of the beef industry, it is a matter of interest that the present development has been brought about by a group of influences originating wholly outside of Brazil: (1) The stimulus to the improvement of the beef cattle came through the demand for good beef in European markets. (2) The improvement of the beef is being achieved by importing cattle that have been brought to high perfection in old and advanced countries. (3) The final step was taken when foreign meat-packing companies that had acquired experience and wealth, mainly in the United States, brought that experience and capital to South America and employed it in developing an export meat industry. This development had been made possible by the perfecting of the refrigeration process and the equipment of refrigerator ships.

Present Condition of the Beef Industry.—There is still a large demand for jerked beef in tropical Brazil, and several hundred thousand cattle are annually slaughtered in over 70 plants devoted to the salting and drying of this meat; 35 of these plants are in Rio Grande do Sul, 27 in Minas Geraes, and 12 in Matto Grosso. They now prepare upwards of 100 million pounds annually, a decline from the high point of 175 million pounds in 1912. As many as 10 modern slaughtering and meat-packing plants have been established in Brazil, including several large ones in the State of São Paulo, and three in Rio Grande do Sul. The majority of the plants belong to the great packing companies of Chicago. Others are British. An impetus was given to this industry by the war demands for meat at high prices, and in one

of the war years, 150 million pounds were exported. After the war, Brazilian exports fell off greatly, because the meat is not so good as that from the River Plate countries.

Cattle raising in a warm country like Brazil has both advantages and disadvantages arising from the climate. The chief advantage is the fact that cattle can graze all the year around without shelter. The great disadvantage arises from the numerous insect pests and diseases. The cattle tick, which carries the Texas fever, and the berny fly are among the chief pests. If, in the future, pests can be controlled, breeds improved, and railway transportation provided, Brazil, with her vast grazing area, can supply enormous quantities of beef. Perhaps it is to this huge country that the meat-importing countries must next look to supply their ever-growing needs, when cooler lands like Argentina, Uruguay, the United States, Australia, and New Zealand have reached their limits of exportation, as the United States already seems to have done.

Hog Raising.—Only three countries, the United States, China, and Germany raise more hogs than Brazil. Most of the 16

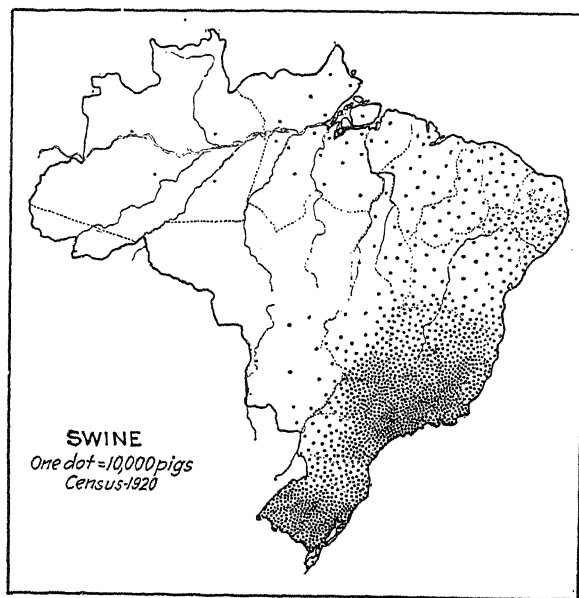


FIG. 155.—Swine raising and corn growing go together in Brazil as they do in the United States. (Map by Hunnicutt.)

million in Brazil are found in the more temperate southeastern states, two-thirds of them in the three prominent states of Minas

Geraes, São Paulo, and Rio Grande do Sul, which also raise most of the corn (Fig. 155). The most successful hog raising is carried on by small farmers who give personal attention to the work. Only small quantities of frozen or chilled pork are exported by the large packers, but very large quantities of lard are exported.

Sheep Raising.—Brazil is, on the whole, too warm to be an important sheep-raising country. Even little Uruguay has more sheep than Brazil, and more than half of the latter's 8 million are in the coolest state of the republic, Rio Grande do Sul.

THE FOREST INDUSTRIES

The Paraná Pine.—There are at least three quite distinct forest areas in Brazil: (1) the vast tropical forests of the Amazon basin; (2) a strip of originally heavy forest from 30 to 200 miles wide extending along the rainy eastern coast from Cape São Roque to Rio Grande do Sul, a distance of 1,700 miles; because of nearness to the centers of population, this forest strip has supplied a large part of the lumber, timber, posts, poles, railway ties, etc., cut in Brazil; (3) the pine forests of the southeast.

The Paraná pine forests cover approximately 100 million acres. Frequently, there are large stands of nearly unmixed pine, with mature trees averaging 80 to 120 feet in height and reaching 4 to 6 feet in diameter. This is the largest and best softwood forest in South America (Fig. 10). It is estimated that there are 50 billion board feet within reach of present means of transportation. About 40 per cent of all the lumber exported from Brazil is shipped from the single port of Paranagua, the ocean terminal of a railway that reaches into the pine belt. A railway from these forests also reaches the populous state of São Paulo. Large modern saw mills equipped with machinery from the United States have been built. An enormous tract of land tributary to these mills has been acquired, and the most important lumbering industry in South America is likely to develop here. From 100 to 125 million feet of Paraná pine are exported annually, about nine-tenths of it going to Argentina and the balance to Uruguay.¹

Yerba Maté.—The forest region where Brazil, Paraguay, and Argentina meet is the native home of the tree that yields yerba² maté or Paraguay tea. Substantially, the entire commercial

¹ See KIRCHER, JOSEPH C. Paraná Pine Lumber Industry of Brazil, *Trade Information Bull.* 92, U. S. Dept. of Com., April, 1923.

² In Brazil, the word is spelled *herva*.

supply of about 100,000 tons a year comes from southern Brazil, eastern Paraguay, and northeastern Argentina. The Brazilian state of Paraná produces about 65 per cent of the supply (Fig. 159). This stimulating beverage, made by pouring boiling water over the dried and pulverized yerba maté leaves, is the favorite drink of several million people, many of whom regard it as one of the necessary items of their diet. It possesses remarkable qualities. It is said that without even the slight injury arising from the continued use of tea or coffee, this drink refreshes, nourishes,



FIG. 156.—Yerba maté tree in open planting. (Photo by Alfred Hasbrouck.)

and stimulates. The tea is usually sucked from a gourd through a special tube called a *bambilla*, and is taken as many times daily as is convenient. Laborers drink it in large quantities to supply a vegetable element in their meat diet, and would resent the deprivation if the drink were not abundantly supplied by their employers.

The tree grows wild in the forest in the same general habitat as the Paraná pine; it attains a height of 20 or 25 feet. It does not grow in solid stands or groves but is mixed with other forest trees, often in dense thickets in which it is difficult to work. The increasing demand for yerba maté and the substantial profits derived from producing it have led to the planting of groves, some of them covering tens of thousands of acres and numbering

millions of trees. One British corporation in Paraguay owns land whose area equals that of the State of New Jersey, only a portion of which, however, is suited to the growing of yerba.

For the artificial yerbaes, the trees are started in carefully prepared beds and are transplanted in orderly plantations much the same as coffee trees. At 4 years of age, cutting begins, and such are the recuperative powers of the tree that 80 to 90 per cent of the branches may be cut off without injury. In the case of the wild trees, cutting is permitted by law only once in 4 years. After removing the branches, they are passed over a fire partially to dry

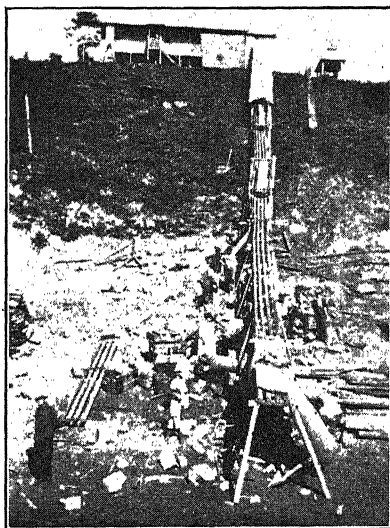


FIG. 157.—Chute for carrying bags of yerba maté from river bank to boats.
(Photo by Alfred Hasbrouck.)

the leaves which are later more fully dried, packed, and shipped to centers where they are ground and prepared for market.

The country in which the yerba is produced has few railroads, and much of the product is shipped by the rivers of the Paraná and Paraguay systems. Small boats collect the bags along the small streams and transport them to points on the main rivers whence the regular river steamers carry them downstream, mainly to Uruguay and Argentina, where most of the exported yerba is consumed. All efforts to create a demand for the beverage in Europe and North America have failed. It would seem, however, that a drink of such merit ought eventually to find extensive use in the northern hemisphere.

Southern Brazil is, by far, the chief producer of yerba, but the best quality comes from Paraguay. Consumption—almost

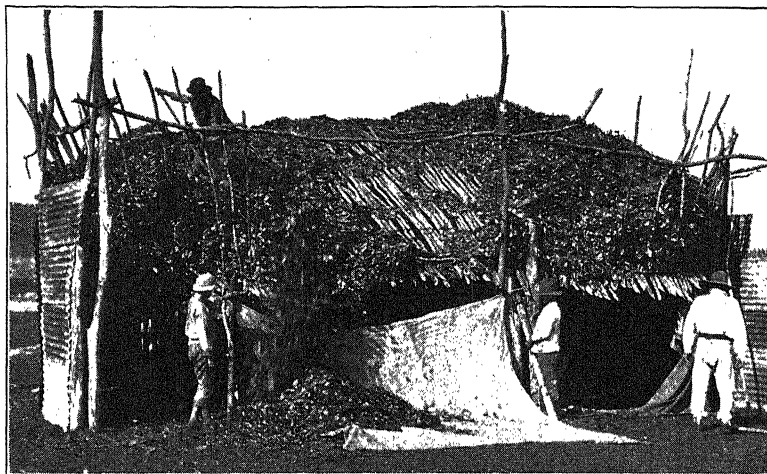


FIG. 158.—Drying the leaves of yerba maté. (Copyright by Ewing Galloway.)

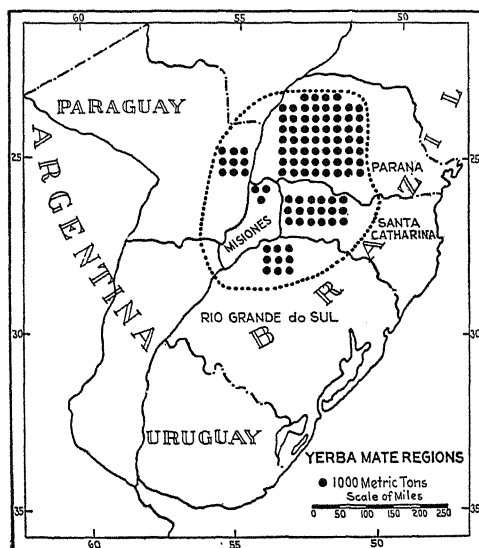


FIG. 159.—Regions of yerba maté production. The Brazilian state of Paraná is the leading producer.

wholly confined to southern Brazil and the River Plate countries—is steadily increasing and had reached 220 million

pounds in 1924. It is one of the least expensive of drinks, the dried leaves selling in quantities at less than 10 cents a pound. Unlike tea and coffee which are so largely consumed in distant lands, yerba is practically all produced and consumed in the basin of the River Plate and its branches.

FUEL

Small Coal Production.¹—Brazil has very limited quantities of low-grade coal in the southeastern states of Rio Grande do Sul and Santa Catharina. Before the World War, Brazil imported nearly all of the coal that it used, and three-fourths of it came from Great Britain. Ocean freights were low, and good British coal sold in the ports of Brazil at \$8 a ton or lower in 1913. In 1917, the same quality of coal sold for four times this figure, a price that was virtually prohibitive. Even at this price, sufficient quantities were not obtainable, and government agencies undertook to aid the development of the low-grade mines in the extreme south. Not only is this coal high in ash (20 to 55 per cent) and in volatile matter, but it is remote from the chief markets and is expensive to mine and transport. When delivered at Santos or Rio de Janeiro, it costs as much as British coal or even more. By crushing, washing, and making into briquettes, a good quality of fuel is made, but it is expensive. Brazilian authorities are hopeful that a successful process for coking this coal on a commercial scale may be discovered, but such a hope does not seem likely to be realized because of the quality of the coal. Only a few mines are operating. The chief one is in Rio Grande do Sul, which at times yields half of the 400,000 tons of coal mined in Brazil.

Wood is quite generally used in locomotives in the interior, and increasing quantities of fuel oil are imported. As a rule, coal power is more expensive in Brazil than is hydroelectric power, and the latter is commonly employed in manufacturing. On the railways of Rio Grande do Sul, some 20 American locomotives designed especially to burn native coal are in use more or less successfully. So desirous are government officials to have Brazilian coal resources developed that they are extending government aid to the operators, and this opens the door to graft under the guise of patriotism.

(For references, see end of Chap. XVII.)

¹ See The Fuel Problem in Brazil, *U. S. Commerce Reports*, Nov. 23, 1918.

CHAPTER XV

THE HEART OF BRAZIL

Geographical Character of East Central Brazil.—This region, consisting of the two large states of Minas Geraes and São Paulo and the two small coastal states of Rio de Janeiro and Espirito Santo, is the most important section of Brazil (Fig. 154). Topographically, it is almost wholly included within the eastern plateau, whose seaward, dissected edge rises steeply from the coastal plain and appears like a mountain range. The water parting from which the main rivers flow toward the Paraná basin is so near the sea that it is within sight of the Atlantic. After passing this escarpment from the ocean side, the rolling, mountain-studded plateau slopes gradually off to the west and merges into the vast plains of the Paraná lowland. Its relief is similar to that of New England, but the mountain ranges are somewhat higher. Most of the virgin forest has been cut, but much brush land exists. Only a minor part of the soil is actually under cultivation, except in favored sections such as the coffee belt of São Paulo. Extensive, rolling pasture lands, fair country homes, and frequent cities and towns along the railways characterize the region. It is a land of coffee and cattle, of considerable manufacturing, and of large mineral wealth, but small mineral production. The minerals are mainly in the State of Minas Geraes.¹ In these four states, constituting only 12 per cent of the area of the country, live 40 per cent of the people. The capital and metropolis, Rio de Janeiro; the most rapidly growing city, São Paulo; the chief coffee port, Santos; the best system of railways and highways; and two-thirds of the factories of Brazil are in this region. Rainfall is usually ample for crops, frosts are rare, summers are hot, and winters are particularly delightful. The elevation of 2,000 to 4,000 feet is an important factor in the temperature and the health of the region. A desirable class of European immigrants flows in gradually and helps to swell the white population which here equals and probably exceeds the

¹ Minas Geraes means *general mines*.

colored. On account of its economic, political, and educational preeminence, this region is truly the heart of Brazil.

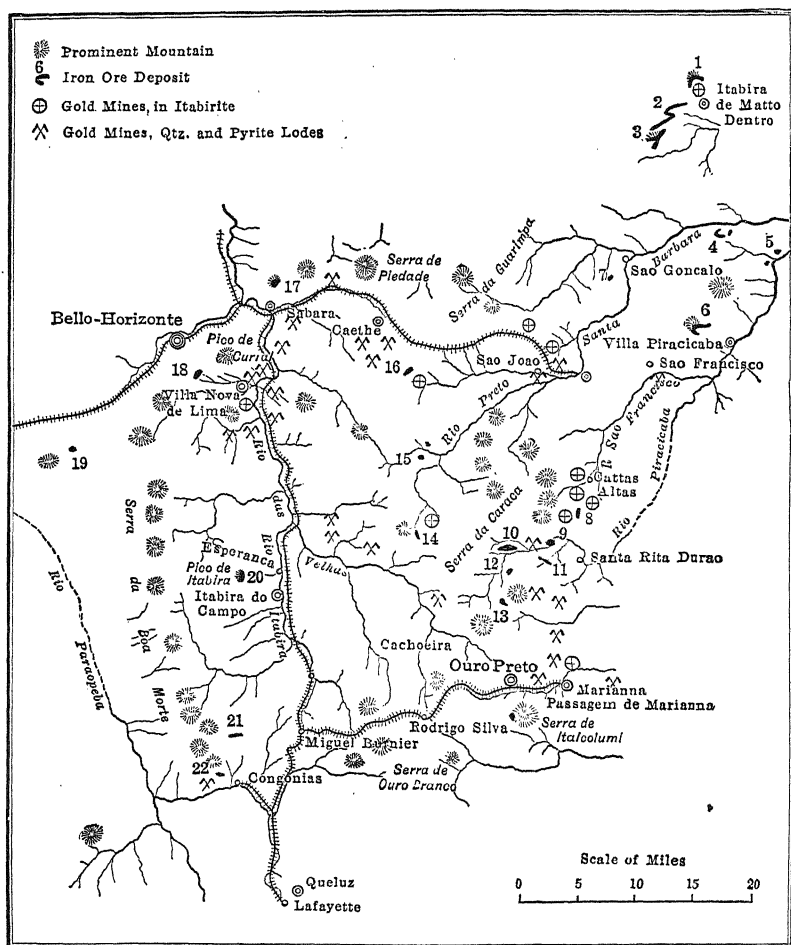


FIG. 160.—Map showing the location of the principal iron-ore deposits and gold mines of Minas Geraes. 1. Caue. 2. Esmeril. 3. Conceicao. 4. Andrade. 5. Monlevade. 6. Morro Agudo. 7. Cocaes. 8. Bananal. 9. Morro da Mina. 10. Alegria. 11. Fabrica Nova. 12. Germano. 13. Tim-popeba. 14. Capanema. 15. Mutuca. 16. Gongo Soco. 17. Gaya. 18. Aguas Claras. 19. Jangada. 20. Catta Branca. 21. Fabrica. 22. Casa de Pedra. (After Harder.)

MINERAL RESOURCES

Output of Gold Now Small.—During the colonial period, the Portuguese, like the Spaniards, were mainly interested in obtain-

ing gold and silver. The most productive period in Brazil was included in the years between 1730 and 1750, during which time 20 to 25 million dollars' worth of gold are reported to have been mined annually, and Villa Rica, now called Ouro Preto, was one of the richest cities in all South America. Both placer and vein deposits are widely distributed in the highlands of Brazil, but very few of these can now be worked at a profit. At present, nearly all the gold comes from two very deep British-owned mines near Bello Horizonte, the capital of Minas Geraes (Fig. 160). The Morro Velho mine is one of the deepest in the world (6,000 to 7,000 feet). At this depth, the mine temperature is well above 100°F., and ventilation is a problem. The second mine, not far away, is not so deep and not so productive. Coal is so expensive that the mining companies have installed hydroelectric plants to supply power for the mines. The great number of mines and of small workings which have been attempted have mostly failed. The recent gold output from Brazil averages 2 or 3 million dollars a year, or somewhat less than that of Colombia. In no country of South America is gold mining now important, and the entire continent yields scarcely 15 million dollars a year as compared with six times that value from North America.

Past and Present Production of Diamonds.—Diamonds have been produced in Brazil for 200 years, but the present importance of this industry is small, due in part to the great output from South Africa. For nearly 150 years, however, Brazil was the world's chief source of diamonds, and even yet, several thousand persons are engaged intermittently in hunting them. Diamonds are found in many of the states of Brazil, but from river gravels in Minas Geraes and Bahia come most of the stones. Diamantina has been the chief of several producing districts in Minas Geraes. Most of the gem diamonds are of small size, seldom exceeding seven or eight carats. Occasionally, large stones are found, valued at hundreds of thousands of dollars. Most of the workings are conducted by natives in a primitive way.

Among the most valuable stones found in Bahia are the carbonados or black diamonds, which formerly were ignored. The carbonados are used mainly for cutting purposes, especially in rock drills and glass-cutters' tools. The average output is unknown, but it probably falls below a million dollars a year, as contrasted with 40 to 50 million dollars' worth of rough diamonds annually exported from South Africa.

Brazil as a Source of Manganese.—Manganese is used in the making of steel. About 14 pounds are employed in making each ton of steel either by the Bessemer process or by the open-hearth process. It is, therefore, one of the key metals. The largest known deposits are (1) in the Caucasus mountains in south Russia, (2) in India, and (3) in Brazil. The last-mentioned country has valuable deposits in several places, but the most accessible mines are in Minas Geraes, 300 miles north of Rio de Janeiro and near the active gold workings. During the World War, when supplies from Russia and India were hard to get, the output of manganese from Brazil rose to over a half-million tons a year, valued at 7 million dollars. In postwar years, the production has been from 200,000 to 300,000 tons. The largest of the steel companies in the United States is the leading producer of manganese in Brazil. Very large deposits also exist in the interior of the country near the city of Corumba, at the head of navigation of the Paraguay River. Recently, manganese has been the most valuable of the mineral exports of Brazil, although it forms less than 1 per cent of the value of all exports. The metal is not used within the country, for Brazil has practically no steel-making industry. Brazil normally supplies around 5 per cent of the world's requirements of manganese, and most of this is shipped to the United States.

The Largest Undeveloped Iron-ore Deposits in the World.—In the State of Minas Geraes are iron-ore deposits of fabulous richness and extent (Fig. 160). They contain upwards of 12 billion tons of the highest-grade ore and huge additional quantities of lower-grade ore. Most of the ore lies at the surface of the ground and forms actual mountains of hematite. More than 50 outcroppings have been located. Nearly all of the ore bodies have passed into foreign ownership, mainly British and American. The most valuable deposits are in the vicinity of Itabira de Matto Dentro, about 300 miles inland from the coast. No railway actually reaches them, but a line from the port of Victoria is nearly completed.

It is an unfortunate fact that nowhere in all Brazil is there the coking coal necessary for iron-smelting operations. A little ore is smelted with charcoal. Electric smelting is expensive, although the mineral region can supply cheap hydroelectric power. It is believed that the only way in which these ores can be utilized is: (1) to build a heavy railway line to the coast;

(2) there to construct great ore docks like those at the head of Lake Superior; (3) to create a fleet of especially designed ore-carrying steamships to ply between this port and steel-making centers on the coast of the United States or of western Europe where the ores will be smelted; and (4) to carry back to Brazil the necessary coke to smelt the iron needed for eastern South America. If a very large volume of business could thus be built up, there is a possibility that the enormous investment might eventually pay. Only a very wealthy corporation, one that is able to wait years for its profits, could undertake such a costly and uncertain project.

In Brazil, each individual state imposes export taxes upon products that are shipped out of the state. This is one of the chief means of securing revenues. Quite naturally, the government of Minas Geraes does not wish to see one of its greatest resources shipped away by foreign corporations without some satisfactory returns to the state. It desires to have at least part of the ore smelted within the state and as much steel as possible made there. Also the Brazilian government wishes Brazilian coal to be used if there is any process by which this low-grade coal can be utilized. All of these conflicting interests will make the mining and utilizing of the Brazilian ores exceptionally difficult, but such rich deposits must eventually come into use.

The Brazilian government reports that 70,000 tons of iron and steel are being produced within the country yearly. Most of the pig iron comes from small plants in the State of Minas Geraes. A little progress in steel making has been made, but the industry is in its infancy, and can exist only because of a high protective tariff.

Monazite Sand.—The peculiarly brilliant light given by the Welsbach gas mantles is due to thorium nitrate in which they are dipped. A leading source of the thorium is the monazite sands formed by the disintegration of certain rocks on and near the coast of central Brazil, which region is one of the two chief sources of this substance. Production is now small, and the industry is rather more interesting than important.

Minerals: Conclusion.—There can be little doubt that the vast area of Brazil contains much undiscovered mineral wealth. It is strange that the value of the mineral output of the country should have actually declined during the past cen-

tury when the world's demand for minerals has been advancing at a tremendous rate; yet such is the case. The known sources of gold and diamonds seem to have been pretty well worked out. Only small quantities of coal exist, and those are of low grade and are found in the far south; hence the huge quantities of high-grade iron ore cannot be utilized within the country except as imported coke or coking coal is employed. Electric smelting with hydroelectric power is not practicable on a large scale. No petroleum of importance has been found, and the oil shales reported to be abundant in Bahia, cannot yet be profitably used. Workable deposits of such useful metals as copper, lead, zinc, tin, and nickel have not been discovered, if they exist. Brazil, one of the largest countries in the world, is yielding a smaller value of minerals than some single mines in Peru and Chile yield.

AGRICULTURE

COFFEE

Dominance of Coffee in the Economic Life of Brazil.—Brazil is in no sense a one-crop country; yet one industry—coffee growing—means more to the international trade of the country than all other branches of agriculture combined. The area of the corn crop, for example, is greater than that of the coffee crop; yet it has far less economic importance. The explanation lies in the fact that coffee is the great money crop and the one great export crop upon which the nation has come to depend. It is the flow of money into Brazil from the coffee-buying peoples of the world that enables the country to buy the imported things which it must have in order to grow. The earnings of its 2 billion coffee trees enable Brazil to pay interest on a heavy foreign debt and to buy the foreign-made locomotives, machinery, structural steel, chemicals, and other products needed for its own development.

It is the demands of the enormous coffee crop that have given this region the best railroad system in any part of Brazil. In the millions of acres of coffee plantations and their equipment lies the largest single source of Brazilian wealth, and the wealthy coffee planters constitute the aristocracy of the nation. No other one of the large countries of the world is so dependent upon a single product as Brazil is upon coffee. Cuba is no less dependent upon sugar, and Chile upon nitrate, but these are countries of small

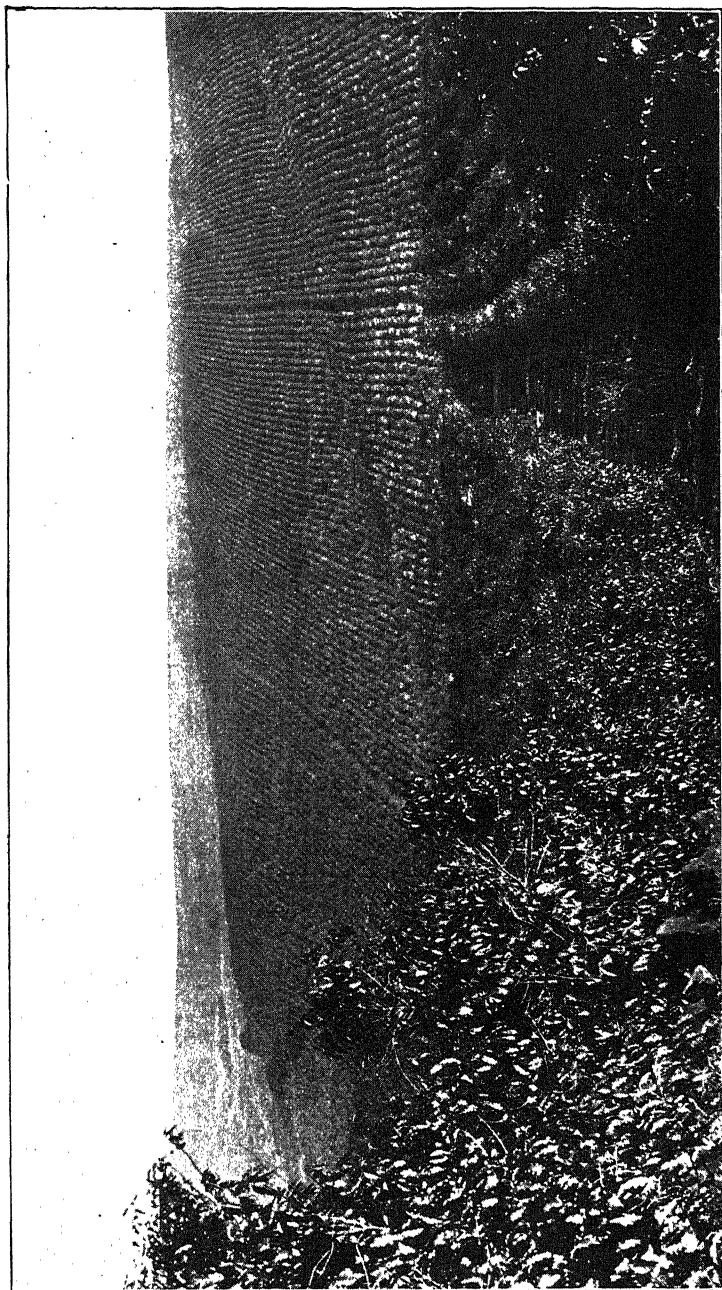


FIG. 161.—Scene in the coffee region of São Paulo. (Photo by Gaensly.)

populations. No considerable part of the national solicitude of Brazil is directly concerned with the preservation, control, or promotion of this dominant industry. The statesmen of Brazil, however, are among the first to recognize that any country so dependent upon the oversea sale of a single commodity is peculiarly vulnerable and peculiarly sensitive to adverse influence in other parts of the world.¹ Consequently, Brazil is seeking to diversify its agricultural production and to secure the highest possible degree of self-sufficiency.

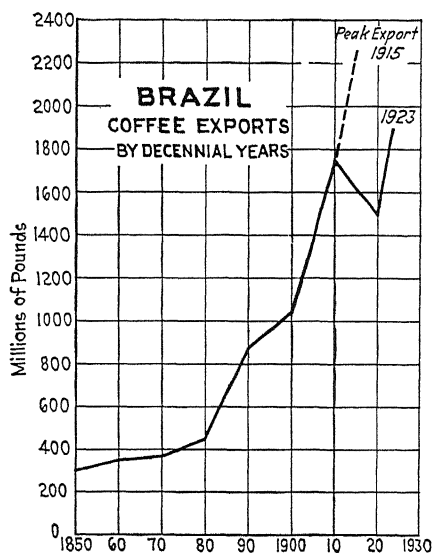


FIG. 162.

Evolution of the Coffee Industry.—When the bloodless revolution of 1889 overthrew the empire of Brazil and instituted the republic, the country was supplying to the world's trade less than 4 million sacks² of coffee yearly (Fig. 162). In the period following, and more especially from 1895 to 1905, an enormous expansion of coffee plantations occurred, and the production about doubled. This precipitated a coffee crisis which was slowly relieved by the valorization methods described in a later para-

¹ During the first half of 1925, the imports of Brazilian coffee into the United States declined on account of the artificially high prices. Brazilian coffee growers became alarmed and sent a commission of inquiry to the United States to ascertain the reason for the declining imports.

² A standard sack of coffee in Brazil weighs 60 kilos or 132 pounds.

graph. From 1900 to 1910, there was practically no increase in the quantity of coffee grown in Brazil; but a little later, new planting was resumed, and an added 4 million sacks a year, or 12 million in all, were placed on the market. In 1907, the production reached the maximum of nearly 18 million bags, or four and one-half times that at the beginning of the republic in 1889. The disastrous frost of June, 1918, did such damage to the trees that for several years the crop was not far from 10 million sacks, but this gradually rose as the trees recuperated, and the output again reached 13 million sacks a year.

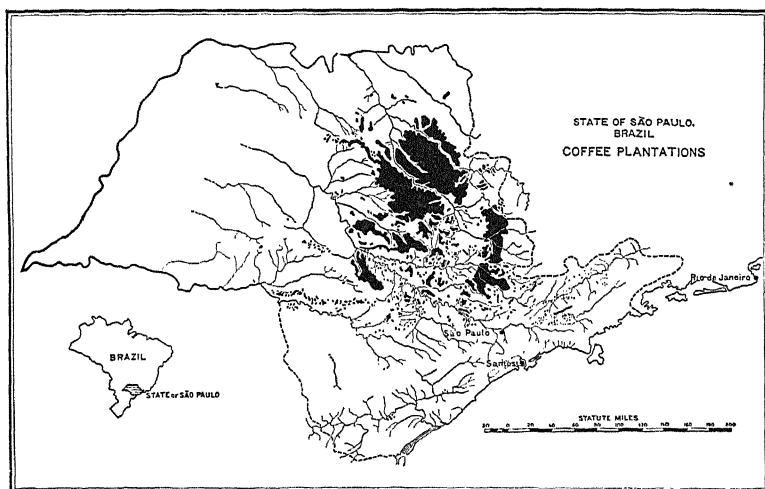


FIG. 163.—The state of São Paulo and its coffee lands. (*U. S. Dept. of Agr.*)

Location of the Chief Coffee Districts.—A century of experimentation has taught coffee planters that a small portion of Brazil is ideally suited to large-scale coffee growing. Seventy-five or eighty per cent of the crop is grown in portions of two states—the northern part of São Paulo and the southern part of Minas Geraes (Fig. 163). Here, on a total area not exceeding a quarter of Indiana, is grown about two-thirds of the world's coffee. The region of most concentrated production is 250 miles northwest of the port of Santos, through which the greater part of the coffee is shipped. Contrary to the usual belief, little coffee is grown close to the city of São Paulo, but the coffee-carrying railroads converge upon this city and feed a steady stream of coffee to the single British-owned railroad which takes it to

Santos, and thereby is made the busiest and most profitable railroad in South America. The São Paulo portion of the coffee belt produces from 40 to 45 per cent of the Brazilian crop; 30 to 32 per cent comes from Minas Geraes, and 10 per cent from the State of Rio de Janeiro (Fig. 164). A more recent development of coffee plantations is in progress in the northern part of the

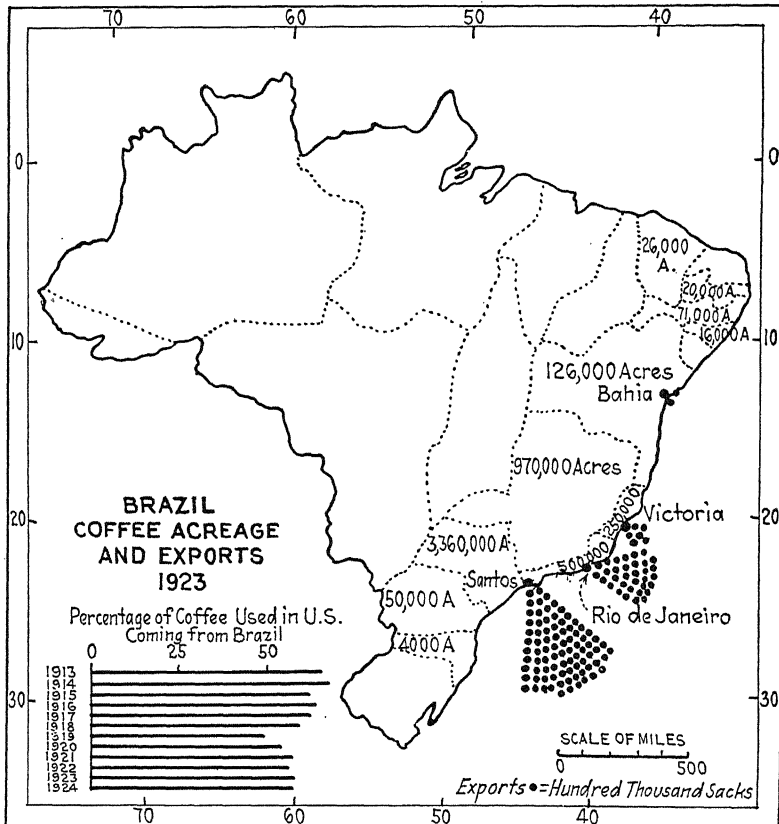


FIG. 164.—Coffee acreage by states. Nearly all of the coffee is exported from two ports—Santos and Rio de Janeiro.

State of Paraná. The success of coffee growing in this restricted area, a success that has completely eclipsed all other coffee regions, suggests that here are combined an unusual number of natural advantages for the production of this particular crop. These advantages are: (1) the peculiar character of the soil, (2) the tropical but not excessively hot temperature, (3) the

rolling and well-drained land, (4) the ample but not heavy rainfall, with a dry season for picking and curing the coffee, (5) nearness to exporting ports, and (6) a more recently acquired advantage, inexpensive electric power for operating machinery on the fazendas.

The Ideal Climate, Soil and Surface.¹—At an earlier period, the center of the coffee belt of Brazil was immediately inland from Rio de Janeiro, in a region slightly more tropical than the present center in northern São Paulo. Gradually, the coffee planters found that the hilly country lying further inland and at somewhat higher elevations is better suited to the crop than the region nearer Rio de Janeiro. In this São Paulo district, the rainfall averages between 45 and 60 inches a year, but there is a dry season in the winter (June, July, August) when the precipitation is only about 1 inch each month, as contrasted

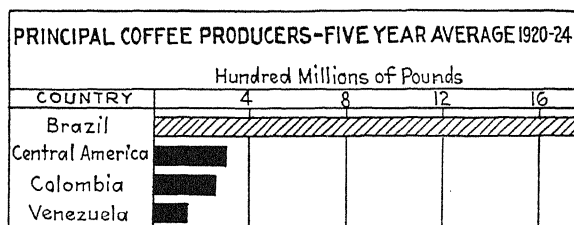


FIG. 165.

with 8 or 10 inches a month during December, January, and February (Fig. 8). Thus there is provided a hot and wet growing season and a cooler and drier harvest season. The traveler in the São Paulo coffee district notes that the coffee trees are mostly on the broad tops and slopes of the hills, while the bottom lands are commonly devoted to other crops or to pasturage. Experience has shown the planter the wisdom of this practice, for on occasional cool nights, the air falls below the frost temperature; thus becoming slightly heavier, it flows down the slopes and gathers in the valleys, where freezing may occur. On rare occasions, freezing temperatures occur even on the higher ground, and serious damage is done. The most suc-

¹ See WARD, R. DEC. The Economic Climatology of the Coffee District of São Paulo, Brazil, *Bull. Am. Geog. Soc.*, vol. 43, pp. 428-455, June, 1910; also by the same author, A Visit to the Brazilian Coffee Country, *Nat. Geog. Mag.*, vol. 22, pp. 908, October, 1911.

cessful coffee lands are those on the outer edge of the tropics between latitudes 21° and $23\frac{1}{2}^{\circ}$ S.

The best soil for coffee is the dark-red loam derived mainly from the decay of intrusive (igneous) rocks, which, in great masses, penetrate the red shales and sandstones of the interior of São Paulo. Red soils are common in Brazil, but the particular *terra rossa* is rich in iron and potash, which are peculiarly in demand by the coffee trees. Coffee is raised on other soils in Brazil, but nowhere else so successfully as on the *terra rossa*.

Equipment and Activities of a Great Coffee Fazenda.—One of the largest of coffee fazendas¹ lies in the northern part of the State of São Paulo, the most intensive of the coffee-growing districts. The activities of this fazenda of over 30,000 acres, with 5 million trees, reveal the magnitude which the largest of these enterprises have attained. Twenty miles of private railway traverse the plantation and connect it with the main railroad. From 7 to 10 million pounds of coffee are marketed yearly. Coffee growing is the principal activity of the fazenda, but not the only important one, for there are kept 2,500 to 3,000 cattle; several hundred acres of cotton are grown, and over 5,000 people employed on the place are housed and fed. In its high degree of self-sufficiency, the great fazenda resembles the English manor of the fourteenth century. A large part of the necessary food is produced on the place. Corn is ground in their own mill, bakery products are made in their own ovens, and meat is slaughtered and sold by their own butcher shop. A general store sells the needed supplies; schools are maintained for the children, a church holds services, and moving pictures are provided. Lumber is cut in their own sawmill from trees grown on the estate, and this lumber is made into their own wagons, cars, and implements. In their harness shop are made the harness and saddlery needed on the plantation; and they have their own shoemakers and tailors. Their own foundry and machine shop casts and tools even the complex parts of their machinery. Almost everything required can be produced, made, or repaired within the fazenda. Of course, it is the large establishment only that attains this degree of self-sufficiency.

Method of Growing Coffee.—The best coffee land is that from which forests have just been cleared. The small coffee trees are started in baskets in the nurseries, and when about a foot high, they are transplanted to their permanent places in rows some 10 or 12 feet apart each way. The tree takes on a bushy growth, and within 5 or 6 years is bearing coffee berries, and continues to do so for 30 to 40 years longer.

¹ The famous Dumont fazenda, now owned by a British company. *Fazenda* has various meanings, but commonly applies to a landed estate of considerable size.

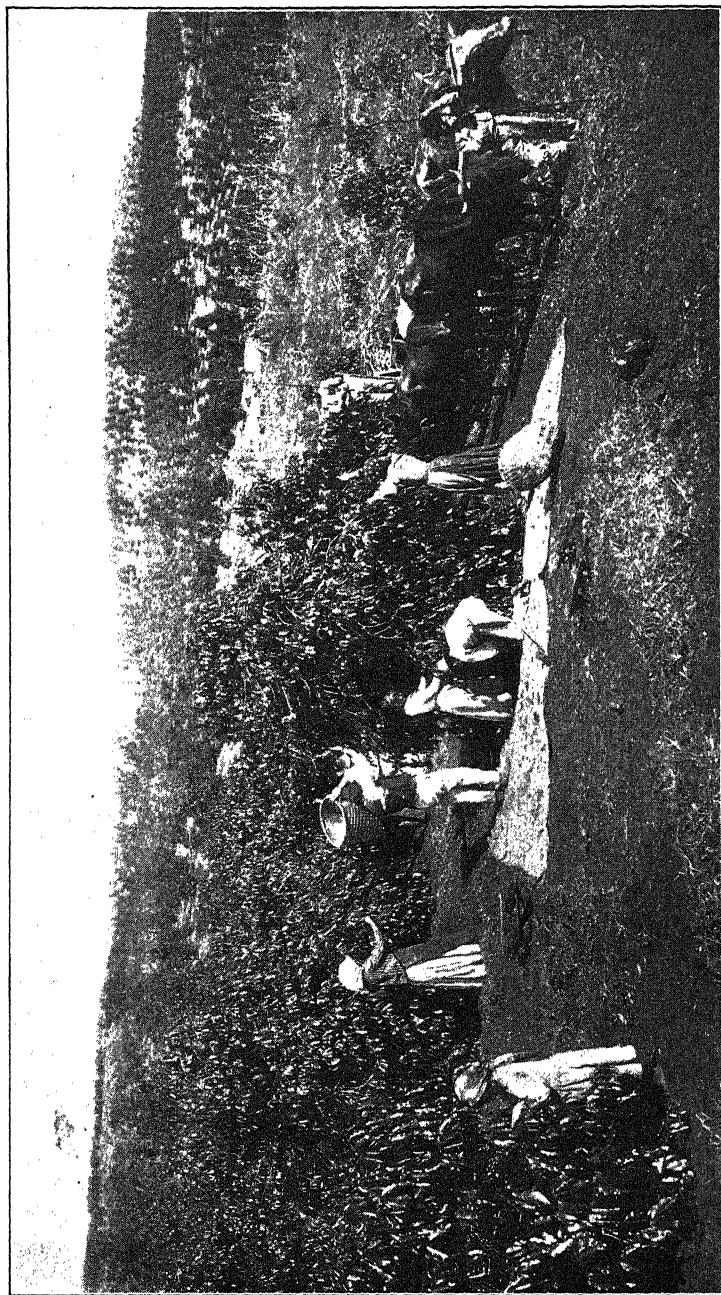


FIG. 166.—Picking coffee in São Paulo. (Photo by Gaensly.)

Its productivity declines in its later years, and a point is reached at which it is economy to replant or discontinue growing coffee on this particular ground; for, like other crops, coffee exhausts the land upon which it grows. One element of superiority of the red soil of this region is its ability to maintain a vigorous production of coffee for a long period of years.

Cultivation of the coffee land must go on steadily to keep down weeds and keep the soil loose. This is almost invariably done on the large plantations by "colonists," who with their families—and the larger the better—live in villages on the plantations and contract to care for a definite number of trees. An adult can care for 3,000 to 3,500. A family with a number of children may care for 8,000 or more. Some kind of fertilization is desirable, and imported chemical fertilizers are used to a limited extent if the price of coffee justifies the outlay.

Harvesting and Preparing for Market.—About the first of May, the trees are loaded with red berries the size of cranberries, and picking begins. The berries are stripped from the branches and fall upon cloth spread under the trees or upon the ground to be raked up later. Occasionally, broad, shallow baskets are used to catch the berries as they are stripped from the branches. Wagons or cars haul the berries to the washing tanks and canals where a sorting out of the inferior berries is accomplished, and pebbles, leaves, and twigs, etc., are removed. Running water carries the washed berries to the mill where the fleshy pulp is removed; then the seeds move on to the drying floors. These are extensive brick-, tile-, or cement-floored areas upon which the coffee seeds, still enclosed in a thin husk, are spread for 8 or 10 days to dry in the sun. Later, the coffee is raked into heaps to cure for several days more. During this drying and curing process, the coffee is injured if it is wet by rain. After this process, the dry coffee goes to another mill which removes the remaining coatings, screens the coffee, and delivers it sorted into several types into jute bags holding 132 pounds. On the large fazendas, all this is done on the place; but much coffee is grown by small planters who take their coffee to central plants that do the work for them.

Handling Coffee at the Port of Santos.—Each year through the port of Santos pass from 7 to 10 million bags of coffee. Under the restrictive control of coffee shipments in force in 1925, 35,000 bags a day were allowed to be shipped from the interior to Santos, and 12,000 to Rio de Janeiro. At Santos are scores of warehouses used by the coffee dealers for storing, inspecting, and mixing the coffee which is afterward carted to the great shipping warehouses which line the water front. By means of modern belt-conveyor and chute systems, the bags are delivered into the

holds of many ships at once, and this is done rapidly and cheaply. The Santos docks are models of efficiency.

At the port are located the offices of the coffee brokers, shippers, and buyers, by whom the coffee is graded into nine types according to quality, tasted by expert tasters, and classified according to flavor. Most of the coffee passes through the hands of some one of 40 or 50 established firms by whom it is shipped. The largest of these handle as high as 500,000 to 800,000 bags a year. They usually advance money to coffee growers, an important service in a country lacking in liquid capital. Santos is a city of practically a single industry. Nowhere else is a great port so fully devoted to the handling of a single commodity as is the case in Santos, second port of Brazil, but first in value of exports.

Efforts to Control Prices.—The geographical conditions under which coffee is grown in Brazil are so favorable, and profits at times have been so large that overproduction has occurred, and the consequent fall in prices endangered the whole industry. In 1902, a law forbidding further planting of coffee trees for a period of years was enacted, but this could not bring immediate relief to the planters. About 1905, the prices were so low, and discontent among the coffee growers was so clamorous that the government found itself forced to go to their aid. After much discussion and prolonged efforts, a foreign loan was secured, and with the proceeds, millions of bags of coffee were purchased, stored in the United States and Europe, and later placed upon the market somewhat slowly. Thus the price was pushed upward, and in the course of 2 or 3 years, the various restrictive measures which were adopted brought demand and supply into accord; the stored coffee was disposed of, the loan was paid back, and a profit was realized by the government. This first valorization plan had been successful, and the coffee industry was rescued for the time being.

Again in 1917, the State of São Paulo felt it necessary to attempt a valorization scheme. It bought up and stored great quantities of coffee for the purpose of maintaining prices, and also of getting into the hands of the planters the much-needed money for their crop. The severe frost of the following year so curtailed the coffee crop that the stored coffee was sold at a good profit, and again the industry was rescued. The third attempt in 1921, involving the purchase and storing by the government of $4\frac{1}{2}$ million sacks, proved successful. Thus have three valori-

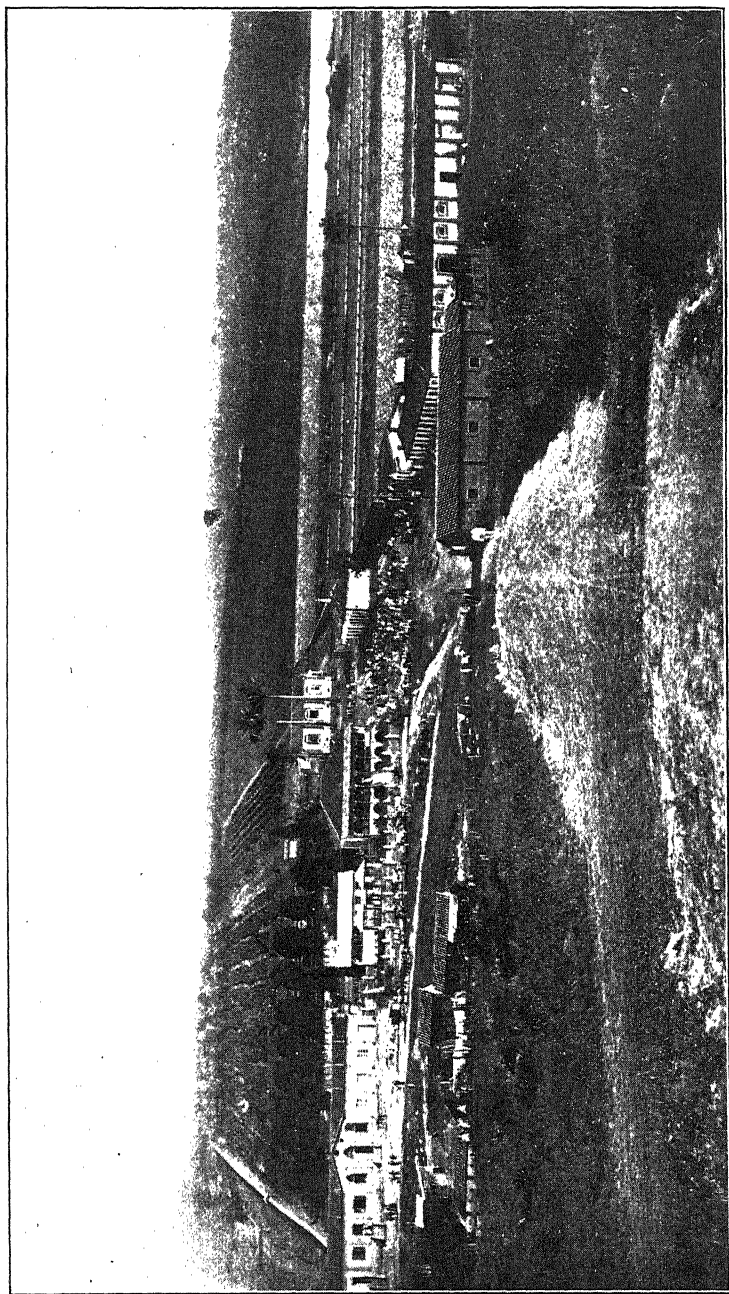


FIG. 167.—Buildings of the coffee fazenda Nova Louzã, São Paulo, Brazil. (Photo by Gaensly.)

zation efforts succeeded, but there is well-grounded opposition to frequent repetitions of government financing of the coffee crop, and other methods of stabilizing prices are being worked out. The plan employed in the year 1924 and immediately following involved the construction by the São Paulo state government of nine large storehouses in the interior of the state (Fig. 169). These are capable of storing at one time about half the annual crop. By law, all coffee of the state must be shipped to these public warehouses where it is stored and warehouse receipts are issued to the owners of the coffee. These receipts can be sold or used as security for loans, and thus the planter may secure money promptly without a seasonal flooding of the market with coffee and the attendant depression of prices. By an arrangement with the railroads, the coffee from the public warehouses may be shipped to Santos, only at the rate of a certain number of sacks a day. Thus it is hoped to maintain prices and protect the industry. Clearly, it is an artificial process. In that it tends to raise prices, it will encourage the extension of coffee planting not only in Brazil but also in other coffee-growing countries, and there is danger that an oversupply of coffee will result, and that artificial methods of price control may sooner or later bring disaster to the industry.

Coffee Exports.—Coffee forms more than half the value of the exports of Brazil, and normally brings in upwards of 200 million dollars a year. Of an average annual export of about 12 million sacks, approximately 75 per cent is shipped from the port of Santos, and nearly all of the balance from Rio de Janeiro (Fig. 164). The national government of Brazil is not allowed by the constitution to collect export taxes, a privilege reserved for the individual states. The greater part of the revenues of the important state of São Paulo comes from the export tax on coffee, amounting to about 6 per cent of its value. So great is the volume and value of the coffee trade that complete facilities for grading, blending, storing, transporting, selling, loading, shipping, insuring, and financing have been perfected, and the major part of these facilities center at the port of Santos.

The greater part of the coffee is shipped in line steamers to North America and Europe. It is a common practice for these liners to take such cargo as is obtainable at Buenos Aires and complete their cargoes at Santos or Rio de Janeiro by taking as much coffee as they can carry or obtain. The United States

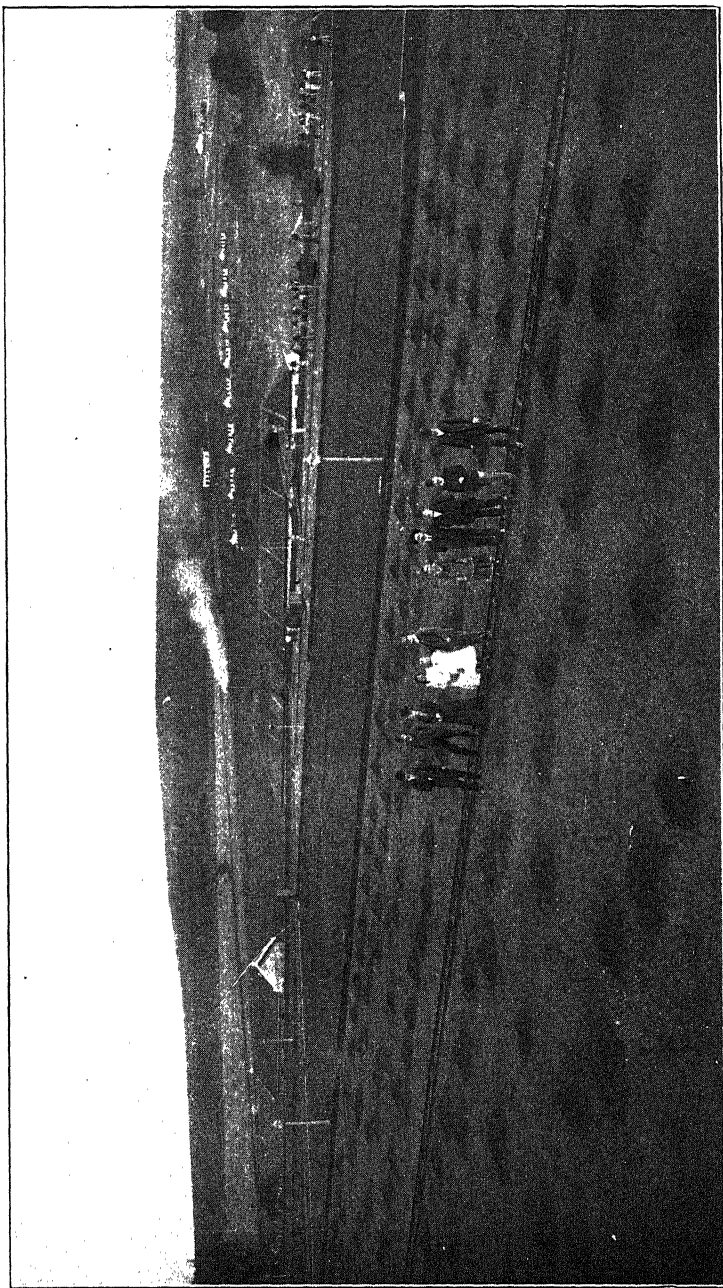


FIG. 168.—Drying floors on the great Schmidt coffee fazenda, São Paulo. (Photo by Gaensly.)

takes more of the Brazilian coffee than all the rest of the world, and as a rule, the greater part of this enters the port of New York; New Orleans is second. In all the principal coffee-importing countries, one port, or at the most, two ports receive most of the coffee. In France, it is Havre; in England, London; in Germany, Bremen; in Italy, Genoa; and in Holland, Amsterdam and Rotterdam. This specialization of certain ports and of a certain section of the port in special products is common throughout the commercial world. It makes for efficiency of handling and centralizes in a convenient way the shipping, importing, and financing companies devoted to that particular product.

Summary of Coffee in Brazil.—The native home of the coffee plant was in the Old World, but it was brought to America where it has so prospered that 80 of 85 per cent of the total production now comes from America, and 60 to 65 per cent from the single country of Brazil. Java, Arabia, Ceylon, and other coffee-growing regions of the East have declined to relative insignificance in this industry. Why has Brazil, of all possible countries, become so preeminently the country of coffee? In this, and in all similar cases, the answer is essentially the same. It must be the same when the complete adjustment of a crop to all the factors involved in its production and marketing is attained. Brazil supplies the greater part of the world's coffee because Brazil is able to produce and deliver an acceptable article in sufficient quantity more cheaply than any other country. In general, the great products of world trade are produced where they are because of geographical and other advantages which the particular regions possess—advantages which enable them to produce and market the products more cheaply than their competitors. In Brazil, there is a large area of ancient rock whose decay yields a particular soil that proves to be ideally suited to coffee. Furthermore, this region of ideal soil lies just where the tropical and subtropical belts meet, giving a climate neither too hot nor too cool. It lies in a hilly upland some 2,500 feet above the sea, and the planter may select just the altitude that gives him relative freedom from frosts and yet avoids the scalding heat of the tropics, which is unfavorable to coffee. Moreover, the rolling topography insures good drainage, but the slopes are not so steep that soil wash is a menace. Added to these favoring features is a type of rainfall that gives ample water for the crop, and yet gives also a relatively dry season of

several months for harvesting the crop. This regimen is found on the outer side of the tropical zone in Brazil. Coffee does not thrive in the heart of the tropics except at high altitudes, and there the marketing becomes expensive. Finally, the Brazilian coffee belt is near the sea. Because of this unusual combination of favoring geographical conditions, Brazil has outdistanced all competitors in coffee growing and dominates the world market in one of the great commercial products.

But these favorable factors easily lead to overproduction. To prevent this or to avoid its economic consequences, the

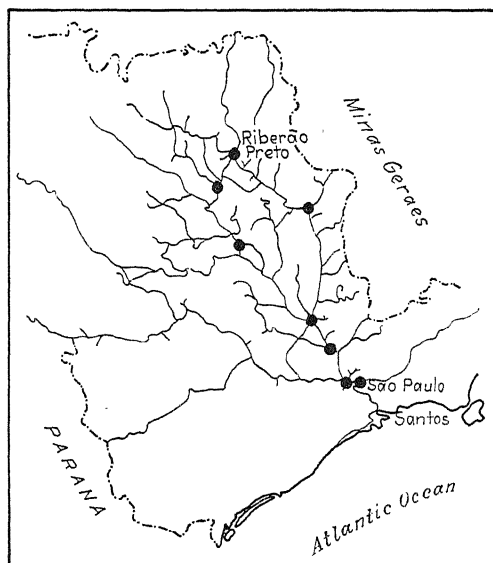


FIG. 169.—Black dots show the location of the coffee storage warehouses in the state of São Paulo.

country is resorting to artificial expedients of valorization or control. It is an excellent illustration of the interaction of geographical, economic, and political forces. One group, the geographical, arises out of the natural conditions; a second, the economic, grows out of the cheapness of production and the consequent tendency for supply to exceed demand; and the third, the political, the effort of government to maintain prices which the other two sets of forces are tending to depress. Seldom can man by thus invoking political or other artificial expedients set at naught for very long the operation of fundamental eco-

conomic influences. A purely artificial bolstering up of prices cannot permanently succeed.

COTTON

Favorable and Unfavorable Factors.—From the State of São Paulo northward for nearly a thousand miles, eastern Brazil has large sections whose climate and soil are well suited to cotton. The total area of such land is said to equal that in the United States. The International Cotton Commission (British) that made a detailed study of eight eastern states in 1921 and 1923 reached the conclusion that Brazil has superior natural advantages for the raising of cotton. The soil, over large areas, resulting from the decay of the ancient rocks of this region, is exceedingly rich in the plant foods required by the cotton plant, and the yield of fiber in some sections is large. In the United States, a good yield is a half-bale to the acre; in parts of eastern Brazil, a bale (500 pounds) of lint cotton to the acre is not unusual, and the Commission found lands producing 800 pounds per acre. Land is cheaper in Brazil than in the United States, and the cost of producing cotton is lower, probably not over one-half as much. But the labor is less intelligent, and the methods of picking are careless. In the southern zone, especially in the State of São Paulo, the ordinary American upland cotton, with a staple (fiber) about 1 inch in length, yields nearly twice as much as in the United States. In the north, a perennial cotton tree produces long-staple cotton for 5 to 15 years without replanting. The British Commission says:

“When one compares the yields of these two zones with those of any other cotton-growing country of the world, one cannot come to any other conclusion but that, in view of the general shortage of cotton in the world under normal conditions, cotton is bound to assert itself there.”

Why, then, is cotton production erratic and relatively small in Brazil? The answer lies partly in the competition of two other crops—sugar in the north and coffee in the south—and partly in the unscientific methods of production. Coffee and sugar have proved, on the whole, more profitable than cotton under the conditions that have prevailed in Brazil. So superior are the geographical advantages for growing coffee in São Paulo and adjacent states that other parts of the world have not been

able to produce it so cheaply. As a result of this favored situation, the planters of one part of Brazil have gradually centered their efforts on coffee, have developed skill in growing, picking, and marketing coffee, and have built up the facilities for transporting, grading, storing, financing, and exporting coffee—in short, have become specialists in coffee. In the same way, the planters of the southern part of the United States have perfected facilities for growing, grading, storing, and marketing cotton. It is usually true that specialization in a certain product in a given region tends more and more to absorb the interests and



FIG 170.—Cultivating cotton fields in São Paulo. (Photo by F. Heyer.)

energies of the people to the exclusion of other products. The industry grows by its own momentum.

In a similar but less intensified way, sugar has been the preferred crop of a part of northeastern Brazil. Moreover, the government of Brazil has done little, until recently, in the way of investigation and encouragement of cotton growing. Now that cotton spinning and weaving have become the leading manufacturing industries in Brazil, interest in cotton growing is increasing. Investigations are in progress, and more careful selection of seed and better methods of growing and marketing are slowly developing. When cotton prices are high, cotton

acreage rises, and when prices fall, the acreage drops. Cotton growing has thus been treated as a side issue and not as a permanent year-in-year-out industry.

The pink boll worm and the cotton worm have reached Brazil but have not proved a serious menace, though their ravages may deter planters from taking up the growing of cotton. The boll weevil that has wrought such destruction in the United States has not yet found its way to Brazil. Insect pests in Brazil are no more serious than in other cotton-growing lands, and in the northeast of Brazil, where the cotton trees provide the long-staple cotton, insect pests are decidedly less serious than they are

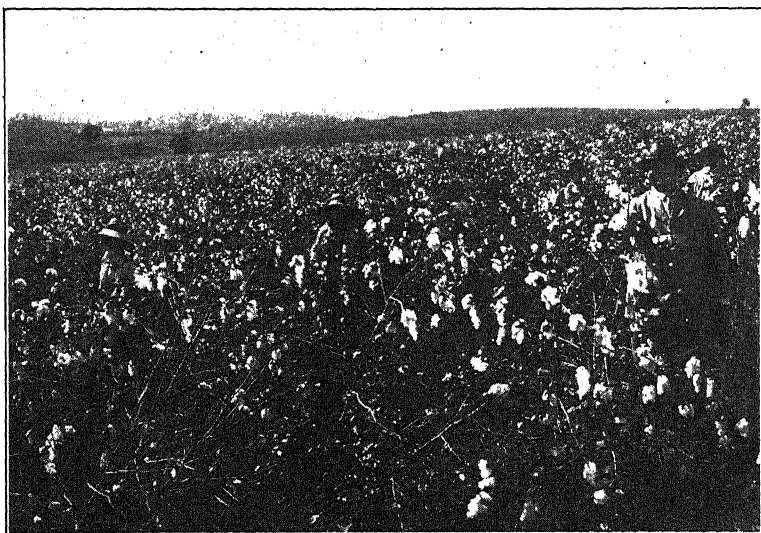


FIG. 171.—Cotton field in São Paulo. Cotton produces heavily in Brazil if intelligently cultivated. (Photo by F. Heyer.)

in United States cotton fields. The annual production varies greatly; yet it does not exceed 800,000 standard bales (500 pounds) as compared with a recent average of 13 million bales in the United States. Brazil ranks fifth among the cotton-growing countries (United States, India, China, Egypt, Brazil).

In concluding its comments upon cotton production in Brazil, the British Commission said to the Brazilian planters:

"You have no cause whatever to complain of any shortcomings of nature, but you must recognize the utter laxity displayed by those whose duty it is to grow and handle the cotton. Once you have overcome your own personal shortcomings, there is no reason why Brazil should not become one of the largest sources of supply of cotton."

This criticism of agricultural methods might be made more general, for the ordinary Brazilian small farmer and farm laborer has little if any education; he is familiar only with careless methods. In the northern half of the country, negroes and mulattoes predominate, and few immigrants come to this region to bring in better methods. In the southern part of the country, with its European immigrants, agriculture is more efficiently conducted, though even here, the average of achievement is not high.

Future Prospects of Cotton.—When the world's demand for cotton is again normal, there is likely to be a shortage; for the chief producer, the United States, is making little progress in ridding itself of the boll weevil. Moreover, the negro-labor supply of the South, upon which the cotton picking depends, is diminishing. The drastic restriction of immigration into the United States is causing a movement of southern negroes northward to do the unskilled labor which was formerly done by the newly arrived immigrants. These two factors, the boll weevil and the shortage of labor, will probably prevent any large increase in the future cotton crops of the South. Brazil is the logical place to which the cotton mills of Europe may turn for increasing supplies of cotton. Whether or not the people and the government of that country rise to the opportunity remains to be seen. They have shown marked ability in growing coffee and in handling difficult problems that have arisen in connection with controlling coffee exports and prices. If Brazil devotes a part of its energies to cotton with the same intelligence that it has shown in the coffee industry, the country will become one of the great cotton producers of the world.

Exportation and Domestic Manufacture.—During the Civil War in the United States, Europe was able to get comparatively little cotton from this country. The price soared to an unheard-of height, and cotton production in Brazil and elsewhere was greatly stimulated. During this period, Brazil in one year exported 355,000 bales, but with the postwar fall of prices, planters went back to sugar and coffee, and Brazilian cotton exports declined to unimportance. The good prices of 1923 and 1924 and the demand created by the increasing textile industry of the country stimulated cotton planting, and exports exceeded 150,000 bales a year,¹ while consumption in the mills of the country at the same time was several times as much. With over 30 million of

¹ The United States normally exports around 6 million bales.

its own people to clothe, Brazil, for some time to come, will use at home the greater part of its cotton.

The making of cotton goods is the foremost manufacturing industry of Brazil; it is chiefly centered in São Paulo and Rio de Janeiro. The industry trebled between 1905 and 1917 and is steadily growing. Modern machinery is in use, dyeing and printing are developed, and nearly all of the common fabrics are made. Only the finer goods are imported. Between 200 and 300 cotton mills, employing upwards of 100,000 workers, are in operation. The Italians of São Paulo, many of whom were cotton-mill operatives in northern Italy, are the leaders in this

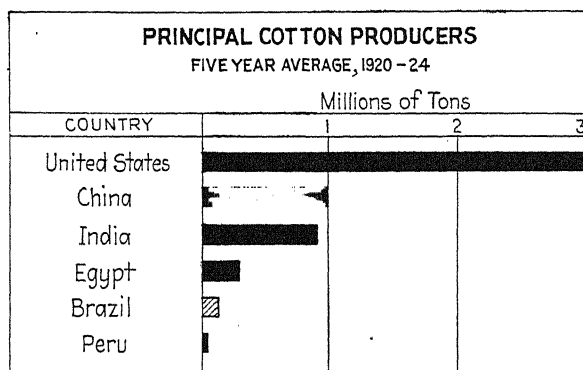


FIG. 172.

industry. Like all manufactures in Brazil, cotton goods are protected by a high import tariff. On the other hand, every yard of goods is taxed. Cotton manufacturing is, however, a very profitable industry, and manufacturers are becoming wealthy.

Food Crops.—In quantity annually raised, corn leads all other food crops by a wide margin as the following table of average annual yields indicates.¹ About 75 per cent of the corn is grown in three states, Minas Geraes, São Paulo, and Rio Grande do Sul, the great food-producing states of the republic, each raising approximately 25 per cent of the total crop of the

	METRIC TONS		METRIC TONS
Corn.....	4,800,000	Potatoes.....	250,000
Mandioca.....	3,000,000	Wheat.....	100,000
Beans.....	600,000	Rye.....	20,000
Rice.....	800,000	Barley.....	6,000

¹ The annual corn yield of Argentina is very nearly the same as that of Brazil.

nation (Fig. 119). Corn combines with rice, beans, and mandioca to form the food of the common people. Corn is also the chief feed for swine, and most of the 16 to 18 million swine in Brazil are raised in the corn belt of that country. Although Brazil ranks next to the United States¹ as a corn-producing country, it raises only about one-twelfth as much. Mandioca² is a native of Brazil; it grows vigorously in poor soil, yields very heavily with little labor, may be prepared for eating in a variety of ways, and is one of the greatest of all starch producers. Only the fleshy roots, as large as potatoes, are used for food. One of the important products is manioc flour, used much as wheat flour is. Owing to the large quantity that an acre produces and to the small amount of labor required to raise the crop, it fits ideally into the agriculture of a country where hard work is avoided. The tapioca of commerce is made from mandioca starch. Of corn and mandioca, as of many other crops, the vast area of Brazil is capable of producing almost unlimited quantities.

Beans form one of the important foods in Brazil, and their per capita consumption is very high. The ordinary cereals, wheat, barley, rye, and oats, are raised but little in Brazil, mainly because they are primarily the products of a cooler climate and do not yield well except in the far south. Nearly all of the wheat grown in Brazil is raised in Rio Grande do Sul, the most southerly state.

Other Economic Activities of the East Central Region.—The predominance of this part of Brazil in wealth, manufacturing, means of transportation, and general progressiveness has already been noted and is further developed in Chapter XVII. The economic leadership of the State of São Paulo is outstanding, and the rapid growth of the city of São Paulo leads many to believe that it will soon be the largest city of the republic. Unfortunately, there is a lack of strong cohesion among the states of Brazil. This was evidenced in the revolution which broke out in São Paulo in 1924, the most serious that the republic has ever had. It was crushed out by federal troops, but this spirit of revolution which has appeared in the southern states and in São Paulo is disquieting. These are leading states of the nation and their loyal adherence to the federal government is essential to the maintenance of the nation.

¹ The annual corn yield of Argentina is very nearly the same as that of Brazil.

² Also called manioc and cassava.

(For references, see end of Chap. XVII.)

CHAPTER XVI

BRAZIL: THE TROPICAL NORTHEAST AND THE AMAZON VALLEY

THE NORTHEAST

General Characteristics of the Region.—Eight states are included in this section of Brazil. Bahia and Pernambuco are the most important. Most of the others are small, and much of their area is coastal lowland. Both Bahia and Pernambuco, however, have large areas that belong to the eastern plateau, and hence are somewhat elevated. Each of the eight states has one or more ports from which short railroads lead inland, but the only cities of importance are on the coast. Two of these cities, Bahia and Pernambuco, rank respectively third and fourth among Brazilian ports.

As a whole, this is the region of lightest rainfall in all Brazil, a fact that is reflected in the large number of goats in the live-stock population. Two-thirds of the 5 million goats of Brazil are found in four of these states. The goat is able to thrive in dry, hot lands better than sheep and cattle. It will be recalled that arid northwestern Argentina is the chief goat-raising section of that country. The light rainfall is also reflected in the relatively small proportion of forest land. Less than half of the region originally carried forests, and much of that has been cleared.

The six small states clustered at the "nose" of Brazil all together have about half the area of Bahia, but they are quite thickly populated, averaging 36 persons to the square mile, a population density about equal to that of the southern United States. A majority of the people are negroes or have negro blood. Tropical agriculture is the dominant industry and, as a rule, is crudely and inefficiently carried on. The yields of cacao, sugar, and tobacco are relatively low, and the average quality of the products themselves is not high. The large state of Bahia produces the greater part of the cacao that is grown in Brazil and leads all of

the states in the production of tobacco. Pernambuco and Alagoas are leading sugar producers. This region also raises two-thirds of the cotton of Brazil, including a species of tree cotton already mentioned.

The general economic condition of this region may be judged from the fact that while it has 30 per cent of the people of Brazil, it supplies only 15 per cent of the exports and takes only 11 per cent of the imports. In other words, its participation in the foreign trade of the country is considerably less than half as much per capita as the average of Brazil as a whole. By way of comparison, it may be stated that the 10 million people of Argentina send abroad an average of 800 million dollars' worth of products yearly, but the 10 million of northeastern Brazil send abroad about 80 millions, or one-tenth as much. It is clear that this part of Brazil, like many other parts, is yielding only a small fraction of its capabilities. It is a case of a tropical people living the easy-going life that their climate permits. Contrast this with the tiny tropical island of Porto Rico which exports as much as the eight states of northeastern Brazil.

Irrigation in Northeastern Brazil.—In four of the northeastern states, the rainfall is exceedingly erratic.¹ During some years, there is a succession of terrific downpours followed by violent floods. In other years, disastrous droughts occur, crops fail, animals die of starvation, and thousands of people are compelled to leave the drought-stricken land and seek a livelihood elsewhere. The great drought of 1877–1880 continued $2\frac{1}{2}$ years. Twenty-nine of these droughts were recorded during two centuries. Irrigation of an inexpensive kind has long been employed, but with indifferent success. In 1919, a very costly series of irrigation projects was authorized by the government. Eleven large dams costing millions of dollars each and many smaller ones were planned, and work was begun. The majority of these are not being completed because of great cost and the deficiency of funds. The work which will be completed may or may not materially relieve the situation. With the vast area of unused agricultural land in Brazil, there seems to be little defense for the expenditure of tens of millions of dollars on uncertain irrigation projects.

¹ See JEFFERSON, MARK. New Rainfall Maps of Brazil, *Geog. Rev.*, vol. 14, pp. 127–135, January, 1924.

CACAO PRODUCTION

Brazil a Leading Producer of Cacao Beans.—A phenomenal increase in the production of cacao beans has taken place in the British colony of the Gold Coast on the shore of the Gulf of Guinea in Africa. Ecuador, once the leading producer, has fallen to a relatively minor position because of the rapid increase in production in the Gold Coast. The average annual export of cacao beans from Brazil, now holding second rank in cacao production, is upwards of 100 million pounds a year, fully 80 per cent of which comes from the State of Bahia. The cacao belt, lying not far from the sea, is 360 miles long by 90 miles wide and contains approximately 70 million trees. Along the southern

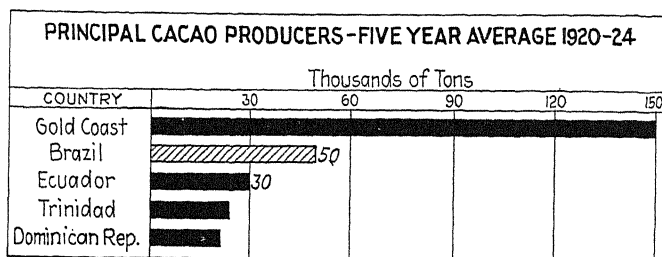


FIG. 173.

coast of Bahia are 10 or 12 small ports, and in the immediate hinterland of these ports and of the larger port of Bahia, most of the cacao of Brazil is grown. It is shipped in small coasting vessels from these ports to Bahia, where the beans are graded, resacked, and exported. Of the cacao thus shipped, 90 per cent is grown near the single port of Ilheos, which is connected by a railway with feeders extending back into a region especially adapted to cacao growing.

As a rule, the new cacao groves are planted on recently cleared forest land and are cared for by natives who do the work in a desultory fashion. They prefer this sort of independent occupation to working for wages; hence, small cacao plantations are the rule. The product is only fair in quality, and the beans usually command a low or medium price as compared with the sweeter cacao of Venezuela, for example. The native planters have little capital and must be financed by local merchants or brokers who charge well for the service. There are a number of

pests that attack the tree or the fruit; the worst is an ant called the quem-quem which kills the young trees in the badly infested regions. The American consul at Bahia says:

"The immediate future of cacao growing in this district is not bright. Transportation costs are high (as there are no wagon roads in the cacao district), and there is a high export tax on cacao. With a reduction in transportation charges and a modification of the export tax, the industry should flourish again."¹

Ordinarily, the United States takes nearly one-half of the cacao exported from Brazil and pays an average price of 10 cents a pound in New York. Of this, the native cacao grower gets little more than half. An acre of well-cared-for trees yields in Bahia 300 to 400 pounds of cacao beans, which at 5 cents a pound gives the planter \$15 or \$20 an acre after the trees begin to bear at 5 or 6 years of age. This is a lower return than coffee, sugar, or cotton yields, but less labor and capital are required, and this fact suits the industry to the unambitious natives who are quite satisfied with a living.

The annual value of the cacao exported from Brazil fluctuates widely because of the rise and fall of prices,² but a fair average of recent years is 10 million dollars, which is less than one-twentieth that of coffee. Bahia is more favorably located for growing and marketing cacao than is the Gold Coast of Africa, and could easily produce as large a crop; but the lax methods employed, the general backwardness of the region, and the absence of constructive help from government sources have permitted even the Guinea Coast of Africa to make greater progress in this industry than Brazil or any other region in America.

SUGAR PRODUCTION

Six outstanding facts about sugar production in Brazil are:

1. The almost limitless *potential* production of the country. Lands in Brazil that are suited to sugar growing total hundreds of millions of acres.
2. The small annual production (700,000 metric tons) contrasted with the possible yield of Brazil, or contrasted with Cuba's 4 or 5 million metric tons.

¹ Consul Homer Brett, *U. S. Commerce Reports*, Oct. 1, 1923.

² Price in Bahia in 1905, 8 cents a pound; in 1907, 17 cents; in 1910; 8 cents. In 1920, prices ranged from 6 to 18 cents a pound.

3. The prolonged decline of the sugar industry from 1880 until the World War, when high prices again stimulated cane growing. The exportation in 1912 was only one-ninth as large as it had been 30 years earlier, and even now the exportation is scarcely back to that of 1880.

4. The wide diffusion of cane growing in every state of the republic, and the great number of little, crude, local mills that produce brown sugar for local use.

5. The lack of business organization, the unscientific methods of production, and the poor and expensive means of transportation.

6. The existence of a considerable number of strictly modern sugar mills and of a few modern refineries. There are said to be about 100 mills with modern or semi-modern machinery.

The Former Importance of Sugar in Brazil.—The colony of Brazil was exporting a little sugar to the mother country, Portu-

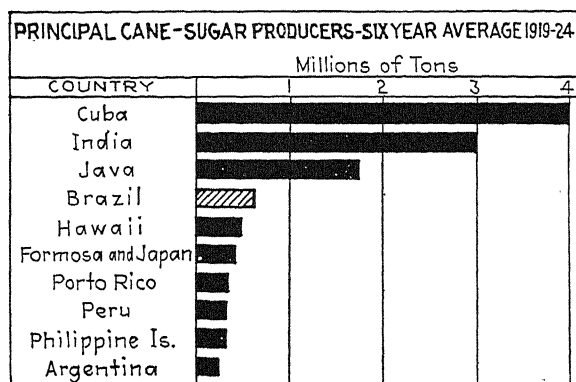


FIG. 174.

gal, when the Pilgrims were settling in Massachusetts. Throughout the seventeenth, eighteenth, and most of the nineteenth centuries, sugar was the foremost of tropical crops and the one that made tropical colonies more coveted by European monarchs than were colonies in higher latitudes. The sugar planters of the West Indies and Brazil were the millionaires of the New World. Two events during the nineteenth century brought the sugar plantations almost to ruin: (1) the abolition of slavery with its consequent shortage of labor, for the liberated slaves objected to regular work; and (2) the rise of the bounty-fed

beet-sugar industry of Europe. By 1900, sugar prices had dropped so low that the inefficient methods prevailing in Brazil could not produce sugar of a quality and at a price that permitted exportation at a profit. In the years 1910 to 1913, only about 27,000 tons of sugar a year were exported from Brazil, while at one time that country was the foremost exporter of sugar in the world. In recent years, the production and the exportation have increased, and Brazil now ranks fourth among the cane-sugar countries (Cuba, India, Java, Brazil).

Principal Sugar-growing Regions of Brazil.—Pernambuco is the premier sugar-growing state, yielding about 30 per cent of the total of the country.¹ Sugar is also the chief product of that state, which some years ago had 1,300 primitive sugar mills, many of which have given place to mills with modern or semi-modern equipment.

The second sugar area in importance is the Campos district along the Parahyba River in the State of Rio de Janeiro. Here, the cultivation is intensive, and methods are somewhat scientific. In this relatively small area, between 75,000 and 100,000 tons of sugar are annually produced. The nearness of this valley to the chief city, Rio de Janeiro, is its main advantage.

The great and populous states of Minas Geraes and São Paulo yield large quantities of sugar, but the sugar lands are widely scattered and most of the sugar is consumed locally. Two little states on the extreme northeastern coast, Alagoas and Sergipe, are also important producers, and these two, together with their neighbor, Pernambuco, supply nearly half of the sugar grown in Brazil.

Future Prospects of Sugar.—Since its return to prominence in Brazil, sugar ranks among the secondary exports of the country; yet the value of these exports is only 50 cents per capita of the population. In Peru, the annual exports of sugar average \$4 per capita of its population, and in Cuba over \$100.

In Brazil, the production and exportation of sugar suffer under the same handicaps that restrict all agricultural industries, with the possible exception of coffee. These handicaps are the inefficiency of the colored laborer, the general backwardness of the methods employed, the export taxes, the insufficiency of capital and of transportation. Brazil is a country of prodigious

¹ SCHURZ, W. L., U. S. Commercial Attaché, *Commerce Reports*, Jan. 7, 1924, p. 44.

producing ability, but deficiencies of various kinds in the greater part of the country prevent satisfactory progress in those regions. In the states of São Paulo, Rio de Janeiro, Rio Grande do Sul, and Minas Geraes, conditions are far more favorable, partly because a better climate has attracted European immigrants, and their energy and ability have aided greatly in developing the vast potentialities of these sections.

The sugar industry of Brazil, like several other industries, needs men of energy, experience, and capital to do for it what

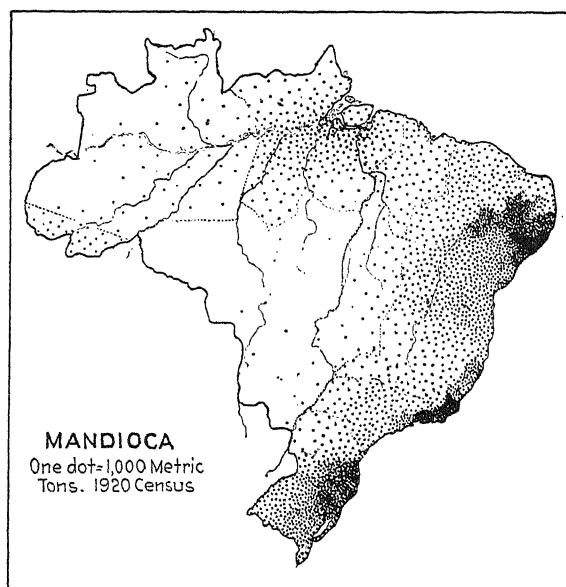


FIG. 175.—Mandioca, the most important starch food raised in Brazil. Tapioca is one of the products made from mandioca. (Map by Hunnicutt.)

such men have done in Cuba, Porto Rico, and Hawaii, and what they have done for coffee in São Paulo. As the world's requirements of sugar increase, Brazil ought to become one of the chief sources. If it does not, the fault will lie not in the geographical factors, but in the human factors—in the people and government of that rich country.

Brazil Second in Rank in Tobacco Production.—Among the farm crops of Brazil, tobacco ranks about eighth; yet the country ranks second only to the United States in tobacco production. the total quantity grown annually somewhat exceeds a good

crop in Virginia, or one-eighth of the United States crop. The State of Bahia produces 40 per cent of the total of Brazil, and Rio Grande do Sul and Minas Geraes together produce nearly as much more. Methods of cultivation and preparing for market are unscientific, and the quality and export price are relatively low. Among the country's exports tobacco usually ranks eighth or ninth, with an annual value of 5 to 10 million dollars.

Other Crops.—It has already been mentioned that northeastern Brazil is the most important source of cotton in Brazil, although São Paulo, as a single state, is the leading producer. This region also raises great quantities of mandioca, the generally used starch food of Brazil. Bananas grow almost anywhere in the tropics; oranges of most delicious flavor and surprising size and cheapness are abundant, notably in Bahia, but in many other states also. The fruit-growing possibilities of Brazil are practically unlimited. The production of rice and corn in the northeast is very small. On the whole, the region falls far below its reasonable production of crops.

THE AMAZON BASIN

Character of the Region.—The Amazon drains nearly 2 million square miles of Brazil in addition to parts of five neighboring countries. The size of Brazil is directly related to the size of the Amazon system. The Pope's Line of Demarcation gave to Portugal only a small part of the area now included in Brazil (Fig. 2). The massive barrier of the Andes prevented the Spanish colonists from penetrating far into tropical South America from the west, but the navigable Amazon system readily led the Portuguese and later the Brazilians into the continent from the east. Moreover, the country tributary to the Amazon has its natural outlet eastward. The geographical factors favored the spread of the people of Brazil over the Amazon basin and up to the very base of the Andes, and they have come into possession of almost all of the Amazon country.

In the Amazon lowland, the rainfall is heavy, although there is a wide variation as the sun moves north and then south in its apparent seasonal migration (Fig. 7). This phenomenon is due to the same causes that give us our change of seasons in the temperate zones. The belt of heaviest rainfall migrates with the sun northward in our summer and southward in our winter, and

gives to the Amazon Valley very heavy rains from December to April inclusive, and lighter rains from May to November (Fig. 8). The great heat and abundant moisture give rise to the tropical forests, or *seltas*, of the Amazon, whose chief product has been rubber.

The Amazon is a river of amazing size. For example, only by constant dredging can a depth of 9 feet be maintained on the Mississippi between New Orleans and the mouth of the Ohio; and 100 million dollars are being expended on the Ohio River to secure a minimum depth of 9 feet at all times of the year. Contrast this with the Amazon, which has an average depth of more than 100 feet for a distance equal to the length of the Mississippi; and in its lower course, it exceeds 200 feet in depth. Ocean-going steamships may ascend the Amazon to Iquitos in Peru, a distance of 2,300 miles, and smaller steamers ascend each of the main tributaries from 500 to 1,000 miles. The depth of the rivers varies greatly from low water in September to high water in March. During high water, some of the rivers rise 40 or 50 feet, overflowing their banks and spreading out to a width that not infrequently reaches 150 to 200 miles. As a rule, the river banks are low and the land is flat throughout the vast flood plain; even at medium height of water, great stretches of swamp fringe the rivers. No other large river has such a gentle gradient; in the final 2,000 miles of its flow, the Amazon descends only 35 feet or an average of 0.2 inch to the mile. It has been said that the Amazon basin, with its great area of swamp lands, the enormous volume of the main river, and the intricate maze of tributaries, is as much a reservoir as a drainage system.

In spite of the boundless food-producing power of which this basin is potentially capable, it actually does not produce enough food for its few scattered people, and imported food is brought in. Many steamships navigate the rivers. The Brazilian government maintains several lines which are usually run at a financial loss that is made up from the Brazilian treasury. The rivers provide ways into the interior, but the climate, the jungle, and its diseases keep the population small.

The Population.—More people live on the little island of Manhattan in New York City than live in the Amazon basin. The great majority of the residents are Indians and half-castes who eke out a scanty subsistence by collecting forest products and possibly carrying on a little crude agriculture.

Manaos is the only important city in the interior of the Amazon Valley. In the height of the rubber-exporting years, this city had a population of 75,000, but its present population is not over 40,000. The city is about 1,000 miles inland on the Rio Negro, near the junction with the Amazon. It was a busy city in former days, handling a large part of the up-river rubber and acting as the chief mercantile and financial center of a vast region. The decline of rubber gathering brought decadence to Manaos as it did to the lesser rubber center of Iquitos in Peru. The exports from Manaos dropped from 25 million dollars in 1913 to 7 million dollars in 1923. The outer port of the Amazon Valley is Pará; its exports fell from 24 million dollars in 1913 to 7½ million dollars in 1923.

In 1920, the population of the Amazon region of Brazil was approximately as follows:

Pará (partly in the Amazon basin).....	800,000 (estimated)
Matto Grosso (partly in the Amazon basin).....	40,000 (estimated)
Amazonas.....	363,166
Acre Territory.....	92,379
	<hr/>
	1,295,545

Average of 1 person to about 1.5 square miles.

The Madeira-Mamoré Railroad.—By a treaty entered into in 1903, Bolivia ceded to Brazil her claim to a large area known as the Territory of Acre at the headwaters of the Amazon. The agreement bound Brazil to provide for the building of a railroad around the rapids of the Madeira River, one of the navigable affluents of the Amazon, heading in Bolivia. Such a railroad had previously been attempted in 1872 and again in 1877, but the difficulties were so great that both attempts had failed. The 19 falls and rapids of the Madeira extend over a stretch of river 211 miles long. They have always been a most serious obstacle to the navigation of this great river, which, with its branch, the Mamoré, forms the chief outlet for eastern Bolivia. In the years between 1900 and 1910, large quantities of rubber were carried down the river, and it was believed that a railway around the rapids would pay. After tremendous difficulties, entailing the death of many hundreds of workmen and involving a much greater cost than was expected, the railroad was completed under the direction of American engineers. Soon after the opening of the railroad came the decline in the output of Amazon

rubber, and the railroad found itself with little traffic. It has proved a financial failure and is now doing only a small fraction of the predicted business. This is the only railroad in the Amazon Valley.

FORESTS AND FOREST PRODUCTS

Extent and Character of the Brazilian Forests.—It is estimated that 58 per cent of the area of Brazil was originally forest covered, and that from 40 to 50 per cent still is forested (Fig. 10).¹ The greater part of the Amazon basin has the heavy rains and high temperature characteristic of the belt of equatorial calms, conditions that make for a dense growth of trees, vines, and underbrush. In this river basin are forests covering a million square miles or more, "probably the most extensive solid body of forest in the world."²

Much of the Amazon forest is of the jungle type. There is a great variety of species, a tangled undergrowth, and a maze of vines looping from tree to tree. In places, one can make his way through these forests only by the water courses or by slowly and laboriously cutting a path. The majority of the trees are hardwoods of many kinds, including such valuable woods as the mahogany, ebony, rosewood, and Spanish cedar. These trees are not found in large groups or solid stands but are widely scattered, one here and one there. So intense is the struggle for space and so dense is the undergrowth that relatively few trees have an opportunity to grow large and stately. Trees exceeding 3 feet in diameter are not common, and an acre of ground that would yield 8,000 board feet of lumber is counted good. The average yield of lumber in the forests of western Washington and Oregon is over 20,000 board feet per acre. The extreme difficulty and cost of getting the timber out of the Amazon region to the world's markets must long retard the exploitation of these forests. The impression sometimes given that tropical forests abound in costly woods and are more valuable than the pine or fir forests of middle latitudes is erroneous. Acre for acre, the tropics have no large forests of such value as the original white pine forests or the Pacific coast forests of North America.

For a country possessing such extensive forests, Brazil exports very little timber. The value of such exports amounts to only a

¹ ZON and SPARHAWK. *Forest Resources of the World*, vol. 2, p. 692.

² *Ibid.*, p. 695.

few million dollars a year. This small exportation is due to two principal causes: (1) the fact that hardwoods predominate, and hardwoods are little used for construction purposes; (2) the high cost of getting the wood out of the forests and delivering it to foreign markets. It is a paradoxical fact that Brazil's enormous forests, one of her greatest natural resources, are at present of minor importance in the country's external trade. For example, only 4 per cent of the wood imported into the United States comes from Brazil.

RUBBER

The Rubber Forests.—In the tropical portion of various countries are found species of trees, vines, and shrubs that secrete

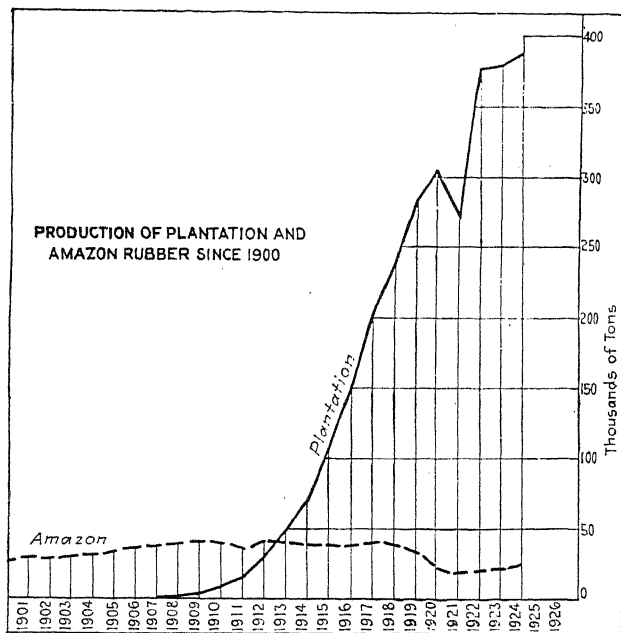


FIG. 176.

a rubber-bearing latex. Over 500 species of such plants are known to exist. In the Amazon basin are a million square miles of forests through which rubber trees are scattered. Of the four groups of species from which most of the Amazon rubber has been obtained, the *Hevea* group of 10 species is much the most important, and in this group, the *Hevea brasiliensis* supplies the greater

part of the commercial rubber. The tree grows only in regions where the average annual temperature is as high as 70°F. and where the annual rainfall is above 80 inches. It is at its best in low, periodically flooded lands. Here, it attains a height of 100 feet or more and a girth of 2 or 3 feet. The finest specimens of these trees, those yielding the best rubber, grow far up toward the headwaters of the Amazon and its tributaries. The rubber trees are not found in dense stands but are distributed at considerable intervals apart. Since the rubber gatherers must cut paths through the jungle from tree to tree, this habit of growth of the trees adds to the difficulties and costs of collecting the rubber. During the rainy season (November to May), the lowlands are flooded, and rubber collecting ceases. All of the rubber must be shipped out by way of the rivers. There are no roads in this part of Brazil; hence, only those rubber trees that stand within carrying distance of the rivers are reached. This means that vast areas of rubber forest remain untouched.

Methods of Collecting and Curing the Rubber.—Relatively little rubber is now collected in the Amazon forests. The methods here described are still employed, but on a much smaller scale than formerly.

Most of the rubber is collected on estates of large size, operated by men or companies having considerable capital. These estates may be from 25 to 75 miles long and a few miles wide on one or both sides of the river. At the opening of the collecting season, the estate owner makes contracts with such Indians or other workers as he can secure. The rubber collector, called a *seringueiro*, obtains his necessary equipment and supplies at the store of his employer and pledges the season's rubber harvest in payment. For these supplies, mainly foodstuffs, he pays five to ten times their value in the markets of the outer world. He then enters the part of the forest allotted to him, builds a rude hut on the bank of the river, and enters upon the season's work. He can take care of about 100 trees.

Tapping the trees is done in the morning and consists in cutting a gash through the bark, for the latex is in ducts in the inner bark. At the lower end of the gash, a little cup is hung to catch the white milk that oozes out and trickles down for a short time after tapping. In the afternoon, the collector makes the round of his trees, gathers the fluid from the cups, and returns with his bucket of latex to his hut. Here, over a smoky fire of palm nuts, he

cures the rubber by dipping a paddle into the latex, smoking the layer of rubber on the paddle, dipping it again, smoking this layer, and so on until a large biscuit or ball of rubber has been built up. This process of tapping and collecting is repeated day after day, perhaps not every day, but several times a week, a fresh gash being made each time. Because of rain, ill health, or disinclination, the worker seldom works more than 4 days a week, collecting a few pounds of latex each day. At the end of the season, he is fortunate indeed if he has collected enough rubber to pay his account at the employer's store. The biscuits of rubber are collected from the camps by canoes or launches, are taken to central stations, and later are sent in larger shipments to Manaus or Pará.

Rise and Decline of the Amazon Rubber Industry.—As early as 1825, 30 tons of crude rubber were exported from Brazil. The growth of this industry was slow, and during the next 75 years (1825 to 1900), the exportation rose to 27,000 tons (Fig. 176). The development of rubber tires for bicycles and later for automobiles gave a tremendous stimulus to crude-rubber production, and the exportation from Brazil reached its high point in 1912, when it attained 43,000 tons, valued at 78 million dollars, and ranked second in value only to coffee among Brazilian exports. At one time, the price of crude rubber rose to \$3 a pound, yielding fabulous profits to the producers. Manaus, the chief interior center of the Brazilian rubber interests, and Pará, the chief sea port for rubber shipments, decided that the flow of wealth would continue indefinitely, built great private and public buildings, and for a time rode on the crest of a wave of prosperity.

In the meantime, the growth of rubber plantations in the Far East, which began about 1880, was going steadily forward. In 1900, 4 tons of plantation rubber were marketed; in 1910, 8,000 tons; and in 1913, the output of rubber from British and Dutch colonies in Malaya, Ceylon, and the East Indies exceeded the output from Brazil. For nearly a decade, the Brazilian production continued at nearly the same level of about 38,000 tons a year; for "up-river fine para" rubber is a very high-grade product, and was not equaled in quality by plantation rubber until after the World War. Following this war, prices of raw rubber declined below 20 cents a pound, and the Brazilian industry was nearly ruined. The 78 million dollar exportation from Brazil in 1912 dropped to 6½ million dollars in 1922. Most of

the rubber gatherers were forced out of the forests by impending starvation. The population of Iquitos, Manaus, and lesser rubber centers in the Amazon basin dwindled. The wonderful boom days were over, and the only important industry in the Amazon Valley was nearly killed by the competition of rubber produced elsewhere more scientifically and much more cheaply. It is estimated that the Amazon rubber costs fully twice as much to place on the market as does plantation rubber. The plantations now furnish about 95 per cent of the world's supply.

Plantations have been attempted in various places in tropical America, but they have not proved successful. If labor and managers of the same quality that are available in the Far East can be supplied in the Amazon basin, plantation rubber can be produced there just as well as in the East.

The rapid rise in rubber prices in 1925, apparently caused by a British enactment which limits rubber production in the British far-eastern possessions, revived rubber-collecting activity in the Amazon basin. If high prices continue, it is probable that rubber plantations will be more seriously attempted in the American tropics.

Nuts, Wax, and Minor Forest Products.—The forests of Brazil yield a long list of products. Brazil nuts are exported to the value of 3 or 4 million dollars a year. The valuable carnauba wax, resembling beeswax, obtained from the leaves of the carnauba palm, is one of the important waxes of commerce, and is exported to the value of 2 or 3 million dollars yearly. Many other forest products—gums, oils, waxes, dye woods, and tanning extracts—are exported in small quantities. The total annual value of forest exports including rubber and exports of maté, reaches only 25 or 30 million dollars a year, a very small sum for a country of such great forest resources. This is less than one-eighth the value of the coffee crop.

(For references, see end of Chap. XVII.)

CHAPTER XVII

BRAZIL: TRANSPORTATION, MANUFACTURING, AND COMMERCE

TRANSPORTATION

Great Extent of Navigable Rivers.—The Amazon system surpasses all other river systems of the world in extent of navigable waters. It is officially stated that there are in Brazil 10,000 miles of rivers navigable by large steamers, and 20,000 to 30,000 miles additional that, at least during a part of the year, can be used by light-draft steamers. During the period when most of the world's supply of rubber was being shipped from the Amazon basin, the rivers were absolutely essential to the industry, for there was no other way of reaching the rubber forests.

In 1912, for example, there were 12 lines of steamers operated by the Amazon River Steam Navigation Company. Every important branch of the river was reached by more or less regular steamships, carrying in supplies to the rubber camps and bringing out rubber and limited quantities of other forest products. All of this traffic has greatly declined with the falling off of the rubber exports; some of the steamship lines have been withdrawn and most of those remaining earn little if any profit, for the population of this region is very small. At times, a small line of Brazilian steamers has operated on the Paraná-Paraguay, connecting interior river towns with Buenos Aires, a distance of about 1,500 miles. Useful as many of the rivers are in enabling people and goods to reach the remote interior of Brazil, Peru, and Bolivia, the cost of transportation is very high. For example, an article that sells for \$10 in New York will sell for about \$40 in the river port of Riberalta in eastern Bolivia. Goods shipped from a European or United States port may be transferred eight to twelve times in reaching such up-river ports as Riberalta.¹ Wood is the fuel mainly used by the steamboats,

¹ DUERR, F. D., in *Bull. Pan-Am. Union*, October, 1916, p. 452.

and much time is consumed in the frequent loadings of this fuel.¹ The sultry heat is intense, the insect pests are numerous and baffling, progress is slow, and delays are exasperating. Yet, without these riverways, fully half of Brazil could scarcely be penetrated at all and would remain practically unknown.

Roads.—A country of such vast extent, mountainous surface, heavy rainfall, and small revenues cannot be generally served by modern roads. Writing of the roads of Brazil, the French author, Pierre Denis, says:

“What these ancient roads are like, more than one well-traveled road of today can teach us. The provincial Brazilians have to fight against an adversary too strong for them; a climate more hostile to roads than can well be imagined. It would cost, I will not say to install such a system of roads as we have in France, but merely to keep them in order, such a sum that the federal budget and the state budgets would stagger under the load; so the Brazilian resigns himself to making none but indispensable repairs, and, meanwhile, to using bad roads. Many are no more than mule tracks; the only transport on such is on the backs of mules or horses. The more important roads, however, allow of the passage of wheeled traffic.”²

Only one Brazilian state, São Paulo, has made much progress in extending over its area a system of modern highways. This one state has 1,200 miles of good motor roads, or three-fourths of the total in Brazil. It has, in addition, over 5,000 miles of roads *passable* by motors during the entire year, and over 4,000 miles *passable* by motors during the dry season. In no other part of South America are there so many miles of good roads as there are in São Paulo. All Brazil has only 20,000 miles of vehicle roads of any sort. It is a significant fact that of all the motor roads in Brazil, 60 per cent are in one state. The single state of Ohio has as many miles of paved or macadamized roads as Brazil has of all kinds of roads combined. The automobile roads between Santos and São Paulo and between Rio de Janeiro and São Paulo are excellent; but such roads are very expensive, and most parts of Brazil could not afford them.

¹ A vivid account of a journey up the Amazon, through the 200 miles of the Madeira rapids, up the Mamoré and Guaporé and down the Paraguay-Paraná to Buenos Aires is given by Alex. P. Rogers in the *World's Work* vol. 23, pp. 625-640.

² Brazil, p. 100.

RAILWAYS OF BRAZIL

General Conditions.—Somewhat more than half of the railway mileage of Brazil is owned by the federal government, about one-third by private companies (mainly British), and the balance

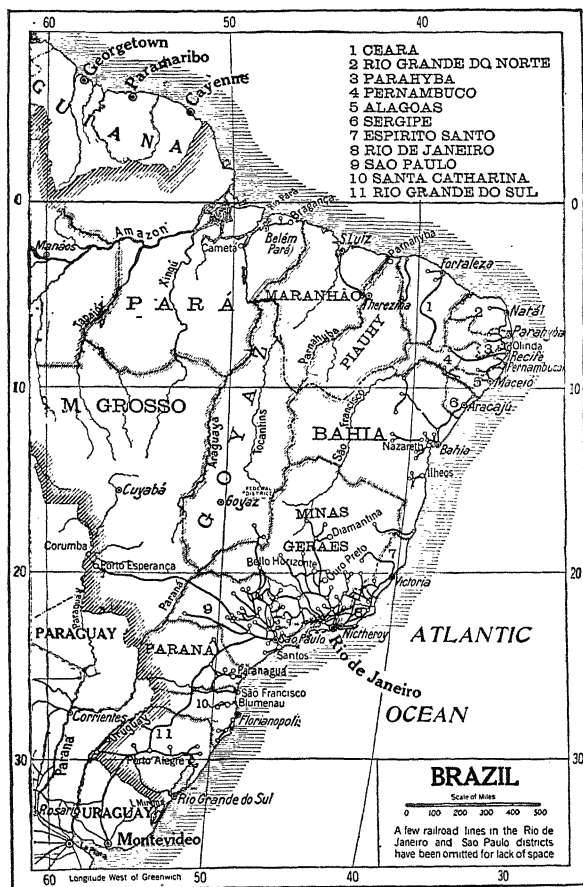


FIG. 177.—Railways of Brazil. The principal railway not shown is the Madeira-Mamoré, in the western interior. (Courtesy W. H. Haas and the *Journal of Geography*.)

by the various state governments. The total mileage is approximately 20,000 as compared with 25,000 in Argentina. More or less continuous railway building is in progress. Among the 140 railroads, there are seven different gages, ranging from 0.6 to 1.6 meters. About 90 per cent of the mileage is 1 meter. Most

of the early roads were built simply to connect sea ports with their immediate hinterlands. The original lines have been extended, but many of these remain wholly unconnected with other lines (Fig. 177). This is notably true in northeastern Brazil where no actual railway system yet exists. In the region extending from Rio de Janeiro southward, the various railroads have been connected, and a serviceable system exists. A long arm of this system extends southward and connects with lines that reach

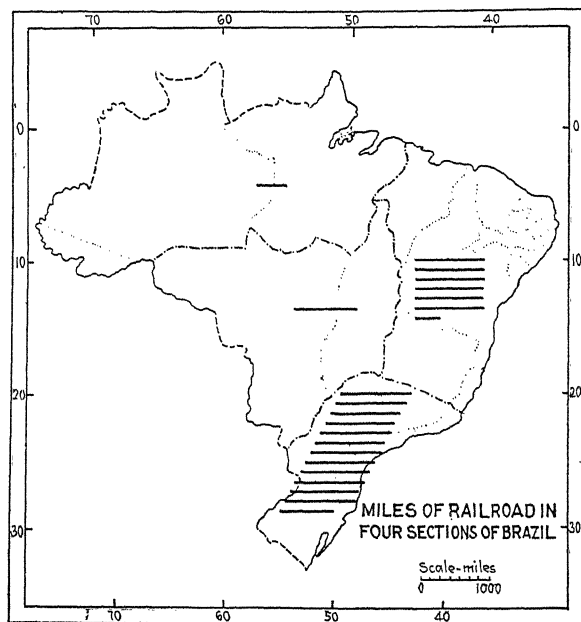


FIG. 178.

Montevideo and Buenos Aires. Another line extends westward to the Paraguay River on the boundary of Bolivia (Fig. 177). Three adjacent states—São Paulo, Minas Geraes, and Rio de Janeiro—contain half of all the railway mileage of Brazil. The progressive southern state of Rio Grande do Sul is also well equipped with railways. The best railroad system is in the coffee belt. Excellent service is maintained between Santos, São Paulo, Rio de Janeiro, and several interior cities. Nearly all of the railways are within 300 to 400 miles of the coast.

Financial Condition of the Railroads.—The British-owned São Paulo Railway earns approximately \$50,000 gross a mile

annually,¹ but the British-controlled Leopoldina Railway, a very important line, has never paid satisfactory dividends and is in financial difficulties. Its gross earnings are only about \$4,000 a mile. The most important government railroad, the Central of Brazil, earns \$10,000 a mile but is not profitable. The majority of the present lines are operated at a loss, which, in most cases, is made up from the public treasury. The deficits are due both to the partially developed condition of many sections of the republic, to the evils of political control, and to the leasehold system, under which certain government roads are leased to private operating companies. How to make the railways pay is

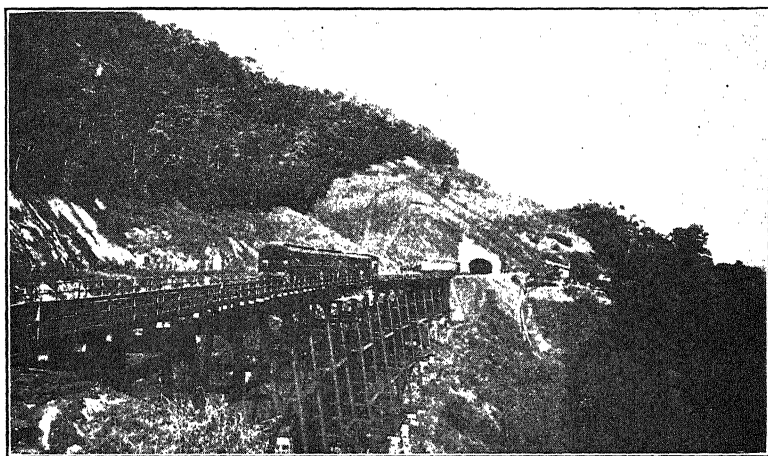


FIG. 179.—Section of the São Paulo Railway between Santos and São Paulo. The busiest and most profitable railroad in South America.

one of Brazil's unsolved financial problems. Large areas, if they are to be developed, need additional railways; yet the government is not able financially to continue building the roads and paying the deficits that are inevitable. Brazil already has a large and burdensome national debt, and its credit in the foreign money markets is under strain.²

The Famous São Paulo Railway.—Most profitable of all South American railroads is the British-owned São Paulo line. It is

¹ Computing the milreis at 25 cents, which is about half its nominal value but double its exchange value in 1925.

² See HALSEY, F. M., *Investments in Latin America*, pp. 142-164 for account of Brazilian railways, *Special Agents Series* 169, U. S. Dept. of Com., 1918.

the only direct outlet to the sea from the great state of São Paulo. Over this excellent double-track line is carried more than half of the world's coffee. The engineering difficulties involved in constructing a railway up the steep face of the Serra do Mar were tremendous. In a distance of 7 miles, the railroad ascends 2,600 feet to the plateau. Originally, the route included four inclined planes with gradients of 10 per cent, up which trains were hauled by cables. A relocating of the line has reduced the maximum gradient to 8 per cent, but cables must still be employed, and only short trains are taken up or down these inclines. The main line extends from the port of Santos, through the

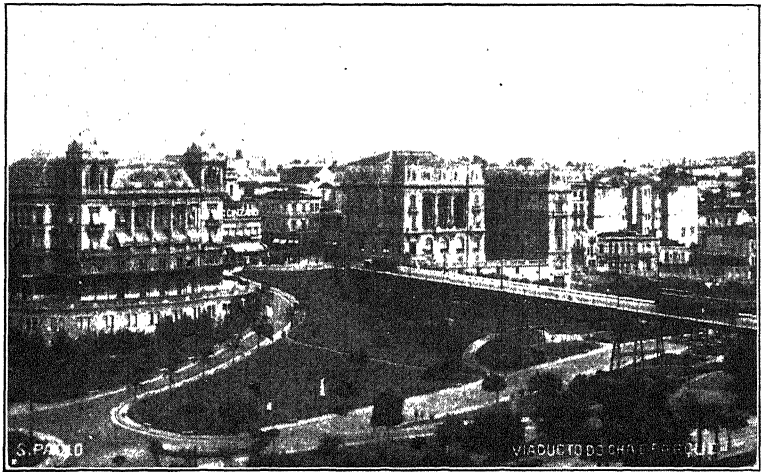


FIG. 180.—Section of the city of São Paulo, most rapidly-growing city of Brazil.

city of São Paulo, and somewhat beyond, a total of 86.5 miles. The 3 million tons of freight annually carried on this line make its revenues per mile very high. After exceptionally generous expenditures upon the line, its equipment, and its stations, the company still has been able to pay up to 14 per cent on its ordinary stock, which has sold at nearly three times its par value. The great prosperity of the road is due mainly to its virtual control of the huge coffee shipments to Santos.

WATER POWER AND MANUFACTURING

Great Potential Water Power.—On account of (1) its large size, (2) the great volume of its rivers due to heavy rainfall, and

(3) the steep and irregular gradients of many of its rivers, Brazil has enormous potential water power. The total is roughly estimated at 25 million horsepower, or about the same as that of the United States. However, the United States has over 10 million horsepower already developed, while Brazil has less than a half-million. Brazil has practically half of the potential water power and more than half of the developed water power of South America. Much of Brazil's potential power is in out-of-the-way parts of the country and will not be used for a long time to come. More than half of this vast potential energy is located at the hundreds of falls and rapids in the eastern highlands, within reach of the most populous states. Many branches of the Paraná reach into São Paulo and Minas Geraes, and the Brazilian portion of this river system is estimated to offer forty times as much water power as the total actual development of such power in all Brazil. The Rio São Francisco has at least 2 million potential horsepower. The most important developments of water power are near the great cities of São Paulo and Rio de Janeiro, where hydroelectric power is used for the factories, for the street railways, for lighting, and to a small extent for railways.

The abundance of water power in the wealthiest and most progressive parts of Brazil is of unusual significance, for Brazil has very little coal and even that is poor and is located in the far south. There are already between 50 and 60 light and power companies in the State of São Paulo alone. Every city of any size in that state has electric lights, and many villages and thousands of farms and plantations have them. In the coffee district—that around Ribeirão Preto—80 per cent of the electric power that is developed is used on the coffee plantations for light and power. In the State of São Paulo alone, 250 cities, towns, and villages have hydroelectric power stations controlled by upwards of 50 different power companies. If Brazil continues to develop its manufacturing industries as it has done recently, there will be a steadily increasing demand for hydroelectric power. The shortage of native coal and the high cost of imported fuel make electric power in Brazil a matter of national significance.

Recent Rapid Growth of Manufacturing.—Up to the time of the World War, Brazil had made slow progress in the development of its manufactures. The country has been essentially a producer and exporter of raw or partially processed commodities.

It mines very little coal and iron, and most of its people have had little training or experience in the complexities of modern manufacturing. Had not the World War cut Brazil off from the free importation of manufactured goods, the growth of manufacturing in the country doubtless would have continued slow. In addition to the war, three other factors have greatly stimulated

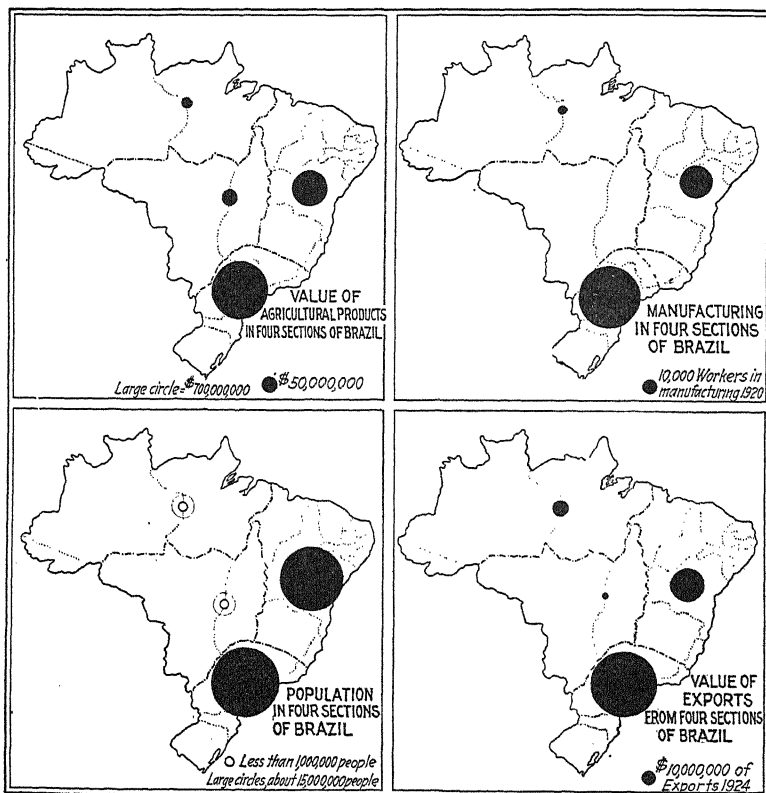


FIG. 181.—The preponderance of southeastern Brazil in the economic life of the country is notable.

manufacturing: (1) the great potential water power of eastern Brazil; (2) the high protective tariff; and (3) the depreciation of Brazilian currency to about one-fourth its par value. This depreciation was felt most in the purchase of imported goods, for the currency had only a fraction of its normal purchasing power when it came to buying imported goods. This was much less true, however, when buying Brazilian products that had been

produced by labor paid in this same currency. During the years from 1915 on for a decade, the profits on Brazilian-made manufactures were large, and rapid industrial progress was made. Between a half-billion and a billion dollars were invested in upwards of 10,000 manufacturing establishments, large and small. By 1925, the value of the output had risen well toward a billion dollars, with textiles easily in the lead. This was more than double the value in 1915. The rapid development of hydroelectric power in eastern Brazil has already been mentioned. This power is an essential element in promoting Brazilian industries and partially compensates for the shortage and high price of coal.

More than two-thirds of the manufacturing establishments are engaged in making five groups of products: (1) foods, (2) textiles, mainly cotton, but also silk, wool and jute, (3) clothing, including shoes and hats, (4) clay products, and (5) wood products. In 20 or more lines of manufacturing, Brazil is virtually independent of imports. These include shoes, hats, tobacco, and matches. Little progress has been made, however, in the working of metals, and nearly all iron and steel products are imported. In all Brazil, there are about 10 small smelting plants.

The city of São Paulo has many large modern mills, notably textile mills. One silk mill employs 3,000 persons. The second manufacturing city is Rio de Janeiro, the capital. The southern state of Rio Grande do Sul is the third industrial state of the republic. In no other part of South America is the growth of manufacturing so vigorous as it is in São Paulo with its stimulating climate, great water power, good railway systems, and capable population, many of whom came from the industrial cities of north Italy. Brazil has certain advantages over Argentina in the upbuilding of industries: a much larger population and, hence, a larger home market; a larger variety of raw materials and cheaper power. By way of comparison, it may be pointed out that all the manufactured goods made in Brazil have an annual value about equal to those made in Milwaukee, Wis., or in Leeds, England.

There is no little discontent among consumers in Brazil because of the large profits made by Brazilian manufacturers under the protection of the high tariff, and the consequent high prices. In this respect, conditions are similar to those in the United States in the past.

FOREIGN COMMERCE AND CITIES

The Foreign Trade of Brazil.—Certain facts relating to the international trade of Brazil stand out conspicuously: (1) The total trade is relatively small, due partly to the high degree of self-sufficiency of the country. So large is Brazil that it can produce the greater part of the things that its people need, and conversely, the population of over 30 million consumes the larger part of the commodities which are produced. The notable increase in manufacturing since 1915 has materially reduced the importations. While the per capita foreign trade of Argentina averages from \$100 to \$150, that of Brazil is about \$20. (2) Five or six agricultural products form 80 per cent of the exports, and coffee alone forms about two-thirds. Other leading

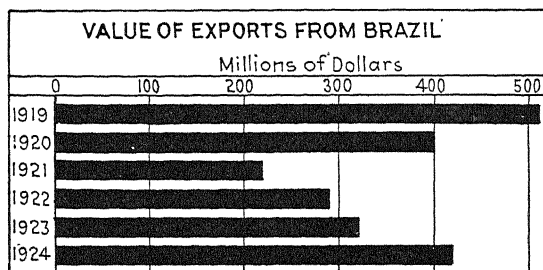


FIG. 182.

exports are sugar, cotton, cacao, and hides. (3) The country sells abroad about 100 million dollars' worth of products in excess of its purchases abroad. This is highly favorable but is more than counteracted by the yearly payment of about 140 million dollars interest on foreign loans. (4) The United States is the largest buyer of the products of Brazil. Our people are coffee drinkers, as distinguished from the British who are tea drinkers. The United States takes 40 to 45 per cent of Brazil's exports but supplies only half that proportion of its imports. At times, Great Britain holds the leading place in supplying imports, and at other times, the United States. Coffee forms about three-fourths of the value of all exports from Brazil to the United States. (5) Rubber, once the second export in value from Brazil, has fallen to a place of minor importance and is now outranked by six or more products. (6) From two-thirds to three-fourths

of the foreign trade of Brazil passes through the two ports of Rio de Janeiro and Santos; the former leading in imports and the latter in exports because of the enormous coffee shipments.

All things considered, the international trade of Brazil is smaller than it ought to be for such a populous country and one so richly endowed by nature. One important reason for this is to be found in the large proportion of colored people who are content to produce little and whose wants are few and simple. The people of southern and eastern Brazil, living in about one-eighth of the total area, are responsible for over four-fifths of the oversea commerce of the country. Although Argentina has less than one-third as many people as Brazil, its international commerce is twice as great. If all the people of Brazil produced and consumed as much per capita as do those of São Paulo, the foreign trade of Brazil would be quadrupled.

The Principal Cities.—Rio de Janeiro, the capital and metropolis of Brazil, owes its location and growth primarily to the superb harbor and its beautiful setting. Evidently, this section of the coast has been depressed in past geologic time, and the ocean has backed up into a deep, broad, coastal basin, fringed with mountains of unique shape and of great beauty. Enormous sums of money have been expended upon the beautifying of this ocean front. For miles, a magnificent boulevard, shaded with trees, brilliantly illuminated at night by multiple rows of ornamental lights, extends along this curving, mountain-studded shore. Unlike most port cities, Rio reveals to the visitor nothing of docks or warehouses or anything unsightly as he enters the harbor. Everything is beautiful. Even the steamer landing is in a park-like section. The city's claim to first place among the beautiful harbors of the world is probably justified. Across the bay is the city of Niteroy, capital of the State of Rio de Janeiro. The city of Rio de Janeiro constitutes the Federal District, corresponding to our District of Columbia, and is politically separate from the state of the same name.

Rio has a population of about 1,200,000 but is growing less rapidly than São Paulo. Rio and Santos are the two leading commercial cities, between them handling upwards of two-thirds of the exports and imports of the country.

While Rio de Janeiro is the present capital of the republic, a Federal District of the future has been legally established in the State of Goyaz, 600 miles inland, in a practically uninhabited

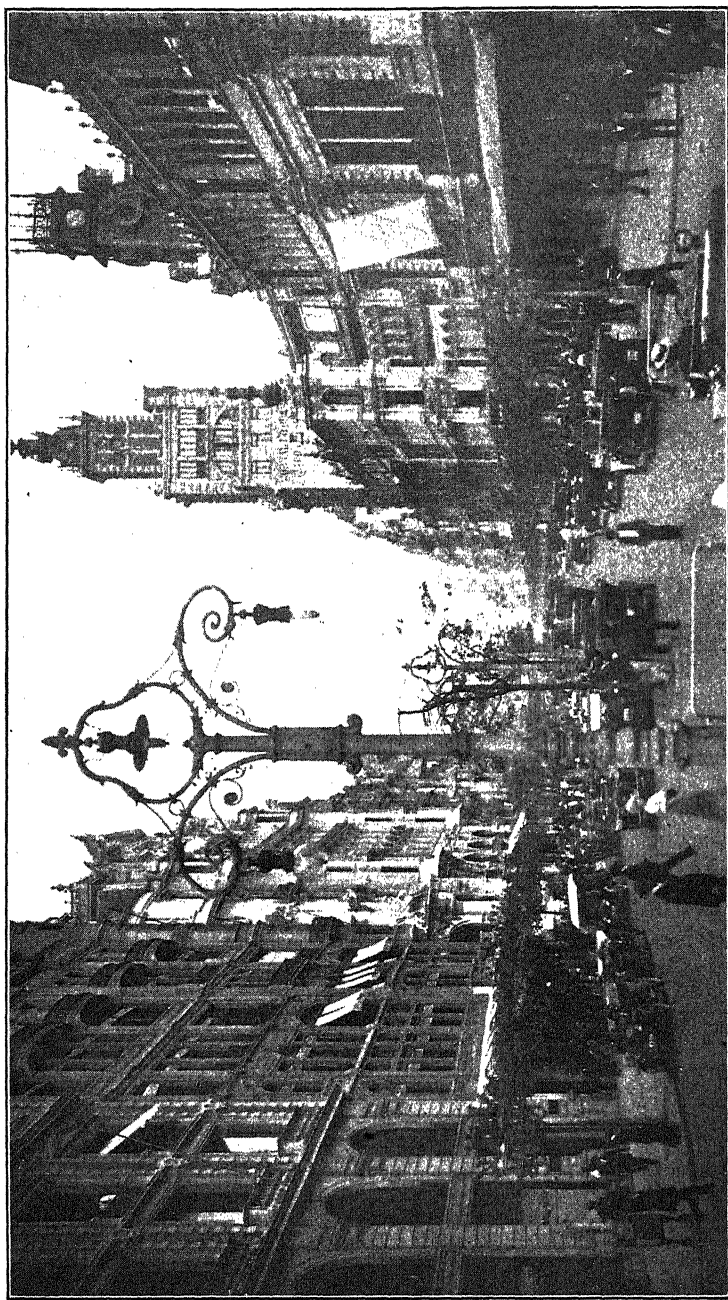


FIG. 183.—Avenida Rio Branco, principal street of Rio de Janeiro.

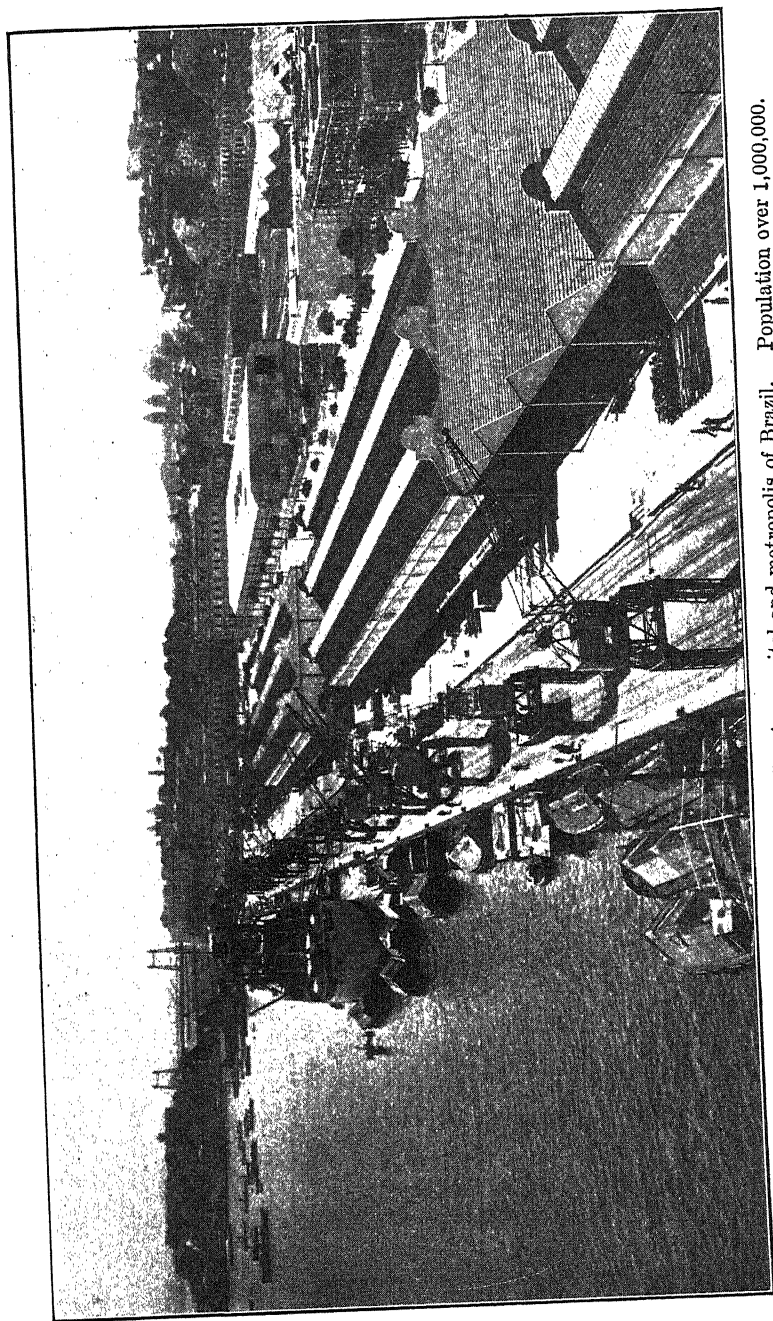


FIG. 184.—Part of the port works of Rio de Janeiro, capital and metropolis of Brazil. Population over 1,000,000.

region (Fig. 177). In northeastern Brazil are three port cities of importance. In order of size, they are Bahia (285,000), Pernambuco (250,000), and Pará (240,000). All are on well-protected harbors connected with points in the immediate hinterland by one or more railroads. Bahia (in Brazil called São Salvador) is the cacao-shipping port, Pernambuco (Racife) is the sugar-shipping port, and Pará (Belem), near one of the mouths of the Amazon, has been the principal rubber-shipping port.

The most important city in the far south of Brazil is Porto Alegre, (180,000) in Rio Grande do Sul. The only city exceeding 100,000 population not situated on the coast is São Paulo (650,000), 30 miles inland.

CONCLUSION

In attempting to evaluate the economic strength of Brazil, these outstanding elements must be taken into account:

1. The large size and great producing power of the country. Nearly three-fourths of the land has a tropical climate, however, and about one-half is covered by tropical vegetation, which man would have to fight endlessly if he tried to bring the land under cultivation. At present, only 20 per cent of the land of Brazil is divided into farms, and only about $3\frac{1}{2}$ per cent is under cultivation. The agricultural exports are much less valuable than those of Argentina, which has only a third as much land and less than a third as many people.

2. More than half of the population lives in a continuously hot climate, and the majority of these are colored people of small producing and small buying power. They contribute relatively little to the economic upbuilding of the nation.

3. In the south and east is an elevated region several times as large as the British Isles, possessing a mild and stimulating climate, occupied by an energetic people, supplied with great potential water power and enormous reserves of high-grade iron ore, but seriously deficient in coal. This section must largely dominate the nation, whose destinies it controls.

4. The high degree of self-rule accorded to the individual states, the heavy foreign debt of the country, and the tendency toward extravagance, waste, and graft in expending public revenues have brought about a critical financial condition which is embarrassing the government.

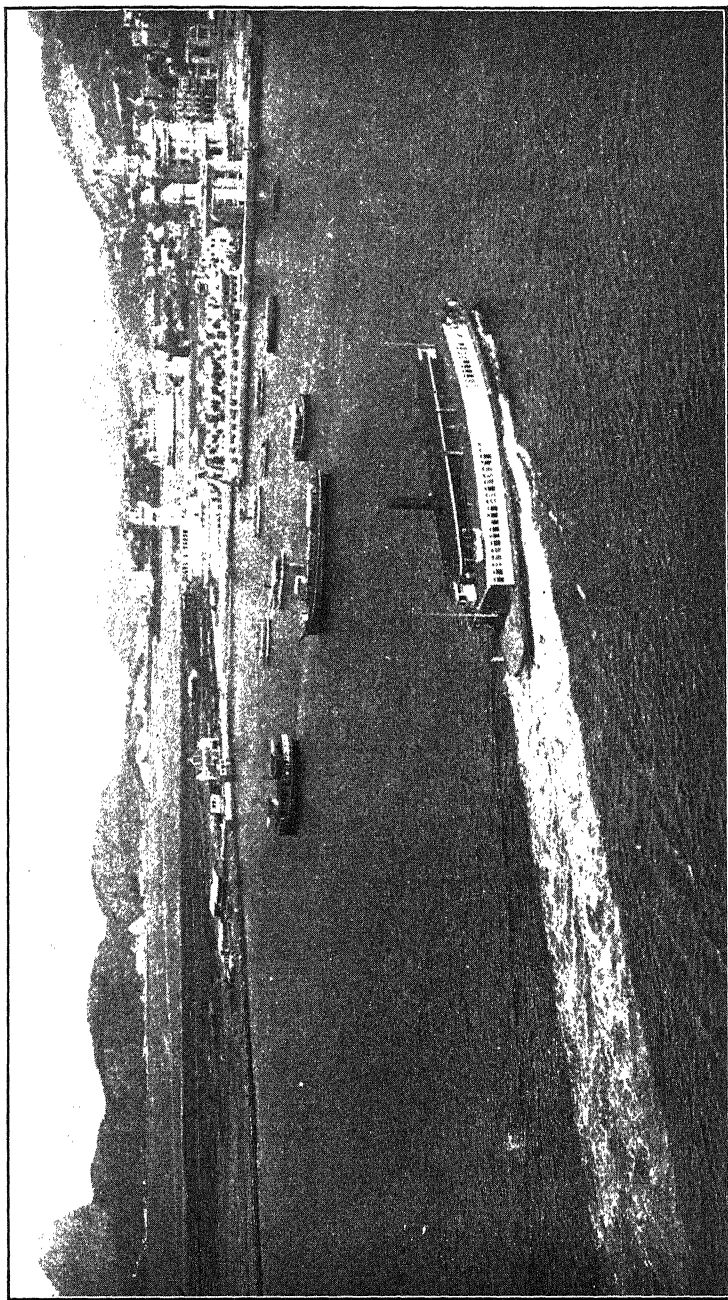


FIG. 185.—Part of the harbor of Rio de Janeiro, one of the best and most beautiful in the world.

5. The export duties collected by the individual states and the high import tariff imposed by the federal government restrict interstate and international commerce, and yet do not supply sufficient revenues.

6. Means of transportation are inadequate; scarcely an eighth of the country is served by railways, and on these the rates are high. Only a few of the present lines are profitable, and it is difficult to secure the funds with which to build new lines. Good transportation, it must be remembered, is the key to economic development.

7. Under a stimulus arising from conditions created by the World War and a high import tariff, manufacturing, mainly in the southeast, has recently made excellent progress.

8. Both because of the high degree of self-sufficiency of the country and because of the low average buying power of half the people, the foreign commerce of the country is small in the total and small in proportion to the population. It is an impressive fact that the little island of Cuba exports more than Brazil.

9. The future of Brazil depends mainly upon the human factor. Size, location, surface, natural resources, and even climate offer far more assets than liabilities and make possible a great nation, if man does his part.

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CHAPTER XVIII

SUMMARY CHAPTER

SOUTH AMERICA AS A WHOLE AND ITS RELATIONS TO THE UNITED STATES

CONTRASTS BETWEEN THE TWO PEOPLES

Economic progress in Latin America has been much less rapid than in Anglo-America. In the acquisition of wealth and in the perfecting of means for creating new wealth, the part of America lying north of Mexico has advanced more rapidly than has the rest of the New World. So rapid has been the material growth of the United States, so widespread and unprecedented has been its material progress that the national life and ideals have become, or appear to the outsider to have become, highly materialistic. Probably to a higher degree than elsewhere, making a fortune has become in the United States the popular ambition. Living in a country of great natural resources, stimulated by an invigorating climate, supplied with ample streams of immigration, and endowed with unlimited stores of mechanical energy, the people of the United States have found irresistible the challenge to go forth and achieve material things in a big way. Such has been the stimulus and so great have been the financial rewards that the American people have found the conquering of forests, the cultivation of the soil, the developing of mines, the building of railroads and factories, absorbing occupations. In such a country and in such a climate, they have come to regard material achievements, business successes, as the most challenging activities of life. Coupled with these conditions has been the heritage of Anglo-Saxon traditions and standards which have guided the political development of the country and have given it a liberal and at the same time a strong government.

In studying the economic development of South America, it is scarcely possible to avoid comparisons with North America, and a North American writer is not an impartial judge. The North American is likely to be proud of the achievements of his

country and to feel that these achievements are due mainly to the qualities of his countrymen and of his government. For the typical American of the United States, the interests and values in life are powerfully influenced by the materialistic civilization in which he lives. His estimate of the kinds of achievement that are most to be coveted, the kinds of success that are most to be desired, is warped. It cannot be otherwise. To him, the Brazilian, using a half hour in sipping coffee in a café in the middle of the morning or afternoon, seems trifling and wasteful of time; and the poetic effusions that delight the young manhood of Bogotá seem a pitiable substitute for baseball or football. It is hard for the hustling, aggressive business type of American to understand that other men may hold a different point of view and yet may not necessarily be wrong.

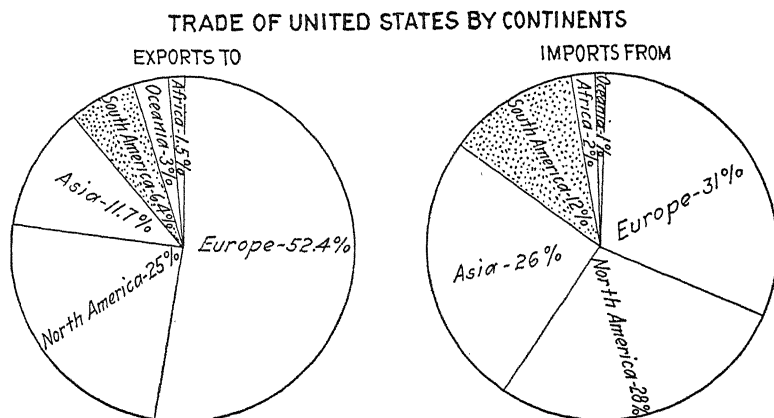


Fig. 186.—The above percentages are averages for the years around 1925.

As a whole, the Latin American's attitude in certain respects is quite unlike that of the American of the northern United States. The latter loves activity; he must be doing; he must be accumulating; he must be winning at the great game of business. The educated Latin American prefers leisure, enjoys spending money more than making it, places great store on being well dressed and well groomed, and finds it more agreeable to put off doing things than to do them promptly. In short, his ideal kind of life, the kind of life from which he gets most satisfaction, is not the business life. He loves more than the North American the ease and luxury that wealth may afford, but he does not enjoy the self discipline or the personal devotion to the details of busi-

ness, or the hard work, by which wealth is ordinarily acquired. This essential difference of attitude toward affairs which characterizes the two peoples partly accounts for the different stages of economic progress which the two continents have reached, and accounts for some of the misunderstandings that arise.

Understanding the reasons why the Latin Americans entertain the attitude toward work and business which they usually do requires an examination of the direct and indirect effects of inheritance and of climate upon their social institutions and economic development. The men who came from Spain and Portugal to conquer and rule these vast dominions in the New World were soldiers, adventurers, and fortune seekers. Few of them were agriculturists; few came to do the hard work of developing a wilderness; most of them came for "gold, glory, and the gospel"; for priests and missionaries as well as soldiers and adventurers came. Neither Spain nor Portugal is well endowed with agricultural land. In both countries the rocky and stubborn land yielded a scanty return, and the agricultural laborers lived a hard and pinched existence. There was nothing attractive about such a life; and, knowing only such agriculture, few Spaniards or Portuguese cared to go to far distant colonies to adopt or continue such drudgery.

On the contrary, the gentlemen of England, the aristocracy, the most honored and respected people, were the holders of agricultural land. Farming was a genteel occupation and carried with it an air of respectability. The English colonists in North America were mostly people who desired to engage in agriculture, and who regarded work on the land as thoroughly honorable for men of standing and substance. In short, the North American colonists came to make their homes on the land and to build up communities founded upon agriculture, in which they themselves actively worked. Gradually the difference in climate developed differences in the type of agriculture in the North and South, made slavery profitable in the South, but not in the North, and created quite different attitudes toward actual labor by white men in the two sections of the United States. Wherever manual labor is done by slaves or by people of an inferior race, it becomes ignoble, and the upper class of society looks down upon it. This is precisely what occurred in Latin America, as it did to a degree in the warmer part of the United States. In a hot climate white men—notably those of north European descent—

find strenuous outdoor labor disagreeable. Consequently, they seek workers who are able to do this labor for them, and in the past they, at times, resorted to slavery. The people of the southern United States were not less humane nor of their own choice less industrious than those of the North. They lived in a different climate and their social institutions and attitudes yielded to the climate.

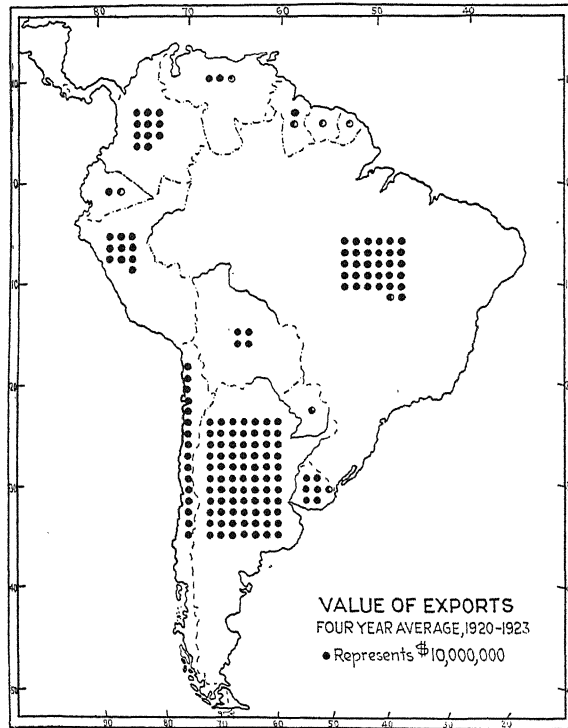


FIG. 187.—Value of exports from South American countries. Note that one dot on this map represents ten times the value that it does in Figs. 195 and 196.

In a similar but more extreme way, the white colonists of tropical South America avoided manual labor and imposed it upon the native Indian or the imported negro slave. They created a social order in which white men occupied the chief offices, filled the professions, held the land, and treated as inferiors those who worked. This attitude still persists but is less marked in Argentina and southern Brazil where large numbers of white laborers from Europe now work on the land and in the cities.

Many of these immigrants have acquired wealth and social standing and have overcome the caste barrier between the gentleman and the man who works. But this barrier still exists, strong where Indians and negroes are numerous, but weakened in the lands of temperate climate. Without question, the attitude of the Latin Americans towards labor is due partly to climate and partly to their Spanish and Portuguese inheritance.

Into the present age, dominated by machinery, commerce, industry, and money making, the typical Latin American of good family fits imperfectly. The life of genteel leisure which he esteems does not give his country railways or factories, and does not develop mines. His may be a more delightful kind of life, but it is out of joint with a commercial and industrial age.

POPULATION

South America is believed to have a population of from 60 to 65 million people. This is less than half the population of North America. About one-half of these live in Brazil, one-seventh in Argentina, and one-third in the Andine countries. Three distinct races form the foundation of this population: (1) the Indians, who occupied the entire continent when the conquering Europeans arrived, and most of whom are now found in the Andine countries. There are probably about 10 million pure-blood Indians left in all South America; (2) whites of European birth or descent who now form 30 or 35 per cent of the population and constitute the governing and property-holding class; (3) negroes whose ancestors were brought as slaves from Africa. Decidedly more than half of the population of South America is Indian, negro, or a mixture of these races with each other and with whites. In Venezuela, Colombia, Ecuador, Peru, Bolivia, and Paraguay, it is estimated that from 80 to 90 per cent of the people have Indian blood. There are considerable numbers of negroes in the lowlands of Colombia, Venezuela, and the Guianas, and they are especially numerous in Brazil. Argentina, southeastern Brazil, Uruguay, and, to a lesser extent, Chile are peopled mainly by whites.

It is noticeable that the economic progress of the various countries is closely related to the makeup of the population, which in turn, is intimately related to climate. In those countries where Indians and mestizos are numerous, they are the

cultivators of the land, the manual laborers, domestic servants, and small tradesmen. The same is true of the negroes and mulattoes in regions where they are found. As a class, the colored and mixed races get little education, own little property, have small purchasing power, and live on a low economic plane. South America buys imported goods to the extent of only \$25 per capita yearly, while Cuba buys about \$100 per capita. The immigrants into South America have been mainly Spanish, Portuguese, and Italians, but there are important German colonies in southern Brazil and Chile, and most of the countries receive some immigration from various European countries. However, few white immigrants go to the west coast, to the north coast, or to northern Brazil, regions where labor is done by the colored peoples. One of the great needs of all South American countries is industrious European immigrants, but in the past most of them have gone to the River Plate lands and to the more temperate parts of Brazil and Chile. South America needs efficient workers, real farmers, and industrial leaders. An unduly large proportion of the important business enterprises are controlled by foreigners.

THE CITIES

South America has two great cities of world importance, Buenos Aires, with about 2 million people, and Rio de Janeiro, with upwards of 1 million. These are beautiful, modern cities that take rank among the finest in the world.

Next in rank are two cities with populations between a half million and a million: São Paulo, the chief coffee and industrial center of Brazil, and Santiago, the beautiful capital of Chile. Both are inland cities in the best agricultural sections of their respective countries. São Paulo is growing so rapidly that it bids fair to pass Rio de Janeiro in population.

In the third group are five commercial cities and ports, all in east-coast countries: Montevideo, capital of Uruguay, Rosario the chief Paraná River port of Argentina, and three ports of Brazil, Pará, near the mouth of the Amazon, Bahia, and Pernambuco, water gates of two of the leading agricultural districts of Brazil. Each of these (excepting possibly Pará) has upwards of a quarter of a million people. The capitals of all the east-coast countries are seaports, and owe their location and growth to commercial as well as to political influences.

The capitals of all the west- and north-coast countries are inland cities. In every South American country, the capital is also the largest city. Four of these capitals are situated high in the mountains to get the coolness that altitude brings—Caracas, Bogotá, Quito, and La Paz. Lima is only a few miles back from the coast, for this coast is rendered cool by the Humboldt current. These cities have populations ranging from 75,000 to 170,000, Lima being the largest. The ports of the west coast are all small cities, with the exception of Valparaiso which approaches 200,000. Antofagasta, Arica, Mollendo, Callao, and Guayaquil are coastal termini of important railways. With these may be grouped Cartagena and Barranquilla on the north coast of Colombia.

MANUFACTURING

In only a few cities of South America has manufacturing become a matter of importance. These are Buenos Aires, São Paulo, Rio de Janeiro, and Santiago; yet all of these together manufacture less in value than a city like Cleveland. South American cities owe their growth chiefly to commerce or to the political and social attractions of the capitals. Smoking chimneys and great factories are few in South America. The 15 leading cities of the continent have an aggregate population about equal to that of New York or London.

GOVERNMENT AND EDUCATION

It is frankly recognized by many South Americans that the majority of their ten republics have been republics only in name.¹ While the general trend is toward improvement, there are frequent set backs. During 1924-1925 there were serious revolutions and attempted revolutions in four countries, including Chile and Brazil, two of the most advanced. A strong president is very likely to develop into a dictator, and it is frequently said that the best governments in the backward countries are the enlightened dictatorships. Far too commonly, public office is treated as an opportunity for personal profit, as it has been and still is in places in the United States.

A very unfortunate condition in most of the countries is the diversion of funds appropriated for public improvements into

¹ See GARCIA CALDERON, F., *Dictatorship and Democracy in Latin America, Foreign Affairs*, vol. 3, pp. 459-477, 1925.

the pockets of a large staff of officials, superintendents, inspectors, and others, with the result that a high proportion of the funds does not get into the authorized improvements. Several of the countries are so heavily in debt and administer their finances so badly that their credit is impaired and they must pay high rates of interest on foreign loans.¹ In the matter of national credit as in other respects, the countries differ widely as between the best and the worst. These countries greatly need foreign capital. The people of large wealth have the greater part of it in land. They either cannot or will not use this wealth freely in the purchase of bonds or stocks of railways and industrial enterprises. Very large sums of foreign capital have been invested in South American railways, mines, port works and other enterprises, with all degrees of success. Some of the ventures have paid handsomely and others have resulted in heavy losses to the investors. It is undoubtedly true that the chief hindrance to the economic development of several South American republics is the foreign capitalists' lack of confidence in those governments.

In the matter of schools,² South America as a whole is deficient, for two main reasons: (1) the lack of funds and (2) the general attitude of the educated classes. As a rule, the latter are but little interested in education for the lower classes. In regions where the colored and mixed races predominate, illiteracy predominates.³ Outside of the cities, schools, as a rule, are few and poor. This is most general in the Andine countries north of Chile and in tropical Brazil. School conditions are best in cities of Argentina, Uruguay, central Chile, and southeastern Brazil. Whereas cities in the United States appropriate for schools from \$40 to \$60 per pupil annually, in many South American cities it is only 20 to 25 per cent as much. Where there is a preponderance of uneducated people, real republican institutions cannot exist; earning power and buying power are low; sanitary and

¹ The majority of the loans to South American countries between the World War and 1925 bear interest at 8 per cent, and some of these bonds are quoted below par.

² See LUCKY, GEORGE W. A. Outline of Educational Systems and School Conditions in Latin America, *Bull.* 44, U. S. Bureau of Education, Washington, 1923.

³ In Brazil, Colombia, Venezuela, Ecuador, Peru, Bolivia and Paraguay, from 80 to 85 per cent of the people are illiterate. In Chile, Argentina and Uruguay, about 30 per cent.

health conditions are bad; and general economic backwardness prevails.

FOREIGN INVESTMENTS IN SOUTH AMERICA

From what is said in the foregoing section, it might be inferred that South American countries have not been able to attract foreign capital to any large extent. They have attracted such capital to the extent of about 8 billion dollars, a large sum, but wholly insufficient for the development of these countries. British investments are by far the largest, and approximate 4 billion dollars.¹ Before the World War, France was the next heaviest investor in South America with a total of about 1.6 billion dollars.² Since the World War, the United States has considerably increased its investments in the southern continent and the United States Department of Commerce estimates the total in 1924 at 1.3 billion dollars. German and other investments bring the grand total in 1925 to 8 billion dollars or more.

The largest investments are in the railways of the east-coast countries. This is mainly British and French capital. Large sums of United States capital are invested in meat-packing plants in the River Plate lands and southeastern Brazil. Still larger sums are invested in mining operations in the west-coast countries. Americans are the largest owners of telegraph cables reaching South America; excellent and frequent American steamship lines connect South American ports with those of the United States. A large majority of the banks in South America are foreign owned. The United States has only recently entered the foreign banking field. In comparison with the British, the Americans have been only moderate suppliers of capital to South America. Since the World War, European countries have not been able to furnish much capital and the United States is increasingly doing this. Often these loans are partly expended in the purchase of machinery, equipment, or other materials from United States manufacturers. Undoubtedly, South American countries will buy more goods from the United States if American investors will lend them the money with which to do it. With some of these countries, borrowing is a pleasant process; but paying is disagreeable and horribly inconvenient.

¹ HALSEY, F. M., Investments in Latin America, p. 20, *Special Agents Series* 169, U. S. Dept. of Com., 1918.

² *Ibid.*, p. 21.

FOREST RESOURCES AND PRODUCTS

It is estimated that 44 per cent of the area of South America is forested, the highest percentage found in any of the continents.¹

South America.....	44.0 per cent	Asia.....	21.6 per cent
Europe.....	31.0 per cent	Australia and Oceania	15.1 per cent
North America.....	26.8 per cent	Africa.....	10.7 per cent
Total for world.....			22.5 per cent

More than a quarter (28 per cent) of all the forest land of the world is in South America; yet the forest products exported from South America have a value of only 50 to 60 million dollars annually. At one time the annual value of rubber alone from the Amazon Valley reached 80 to 90 million dollars. The total annual value of forest products for South America is unknown, for those products that are used locally are not reported. They doubtless exceed the forest exports in value.

The following figures represent an approximate average value, but there are wide variations from period to period.

ANNUAL VALUE OF EXPORTS OF FOREST PRODUCTS FROM SOUTH AMERICA

Quebracho wood and extract...	\$15,000,000 to \$20,000,000
Rubber and balata.....	12,000,000 to 15,000,000
Yerba maté.....	10,000,000 to 15,000,000
Paraná pine.....	3,000,000 to 5,000,000
Brazil nuts.....	2,000,000 to 4,000,000
Vegetable wax.....	2,000,000 to 4,000,000
Ivory nuts.....	1,500,000 to 3,000,000
Cabinet woods.....	500,000 to 1,000,000
Miscellaneous.....	1,000,000 to 2,000,000

Total.....	\$47,000,000	\$69,000,000
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By way of comparison, it may be pointed out that the single item of lumber exported by the United States has a value of about 100 million dollars, and from Sweden 80 millions.

The small present production of rubber is, of course, due to the successful competition of plantation rubber grown in the Far East. The relatively large value of quebracho extract is due partly to the accessibility of the forests in northern Argentina, and still more to the fact that this excellent tanning material is found nowhere else.

¹ ZON and SPARHAWK. *Forest Resources of the World*, vol. 1, p. 3, gives the following ratio of forests to the total area of the continents:

Yerba maté is obtained partly from wild forests and partly from plantations, and the relatively large output is due to the great demand for this stimulating and harmless beverage by the people of southeastern South America.

In spite of the abundance of such valuable woods as mahogany, ebony, rosewood and Spanish cedar in the tropical forests, the great expense involved in getting the logs out of the jungle prevents any large extension of this industry.

The forests of southern Chile are of importance to that country, but very few of their products are exported.

Throughout South America, hardwoods predominate. The only large area of softwood (conifers) is the Paraná pine region. It is an impressive fact that the value of nitrates exported from Chile is nearly double the value of all forest products exported from all South America. The forest industries of this continent are merely in their infancy. They will increase in importance as the continent develops.

MINERAL RESOURCES AND PRODUCTS

Regarding mineral production in South America, seven facts stand out prominently:

1. The great importance of Spanish America in the production of gold and silver during the colonial period. The Spanish conquerors centered their efforts upon the quest for the precious metals, and the forced labor of the Indians was inexpensive. The yield of gold in Spanish America during this period reached well into the billions of dollars.

2. The dominance of the Andine region in mineral production in South America, due to the high mineralization of these young, volcanic mountains.

3. The preponderance of nitrate, which constitutes the leading items in value of all the minerals produced in South America. The accumulation and preservation of these great deposits is directly connected with the arid climate of the region.

4. The very small production and small deposits of coal, the most essential industrial mineral. This, of course, is due to geological causes.

5. The vast deposits of iron ore, especially in the ancient rocks of Brazil, and the very small amount that is mined, due partly to the lack of coal for smelting it.

6. The large extent to which the principal mineral workings are controlled by foreign capital, due both to the shortage of capital in South America for investment and the insufficiency of trained and experienced mining men within the countries.

7. The small production of minerals in South America in comparison with North America and Europe and in comparison with what the continent probably will produce in the future.

For three centuries, Spanish America was the synonym for gold and silver, and for a time, Brazil also yielded much gold

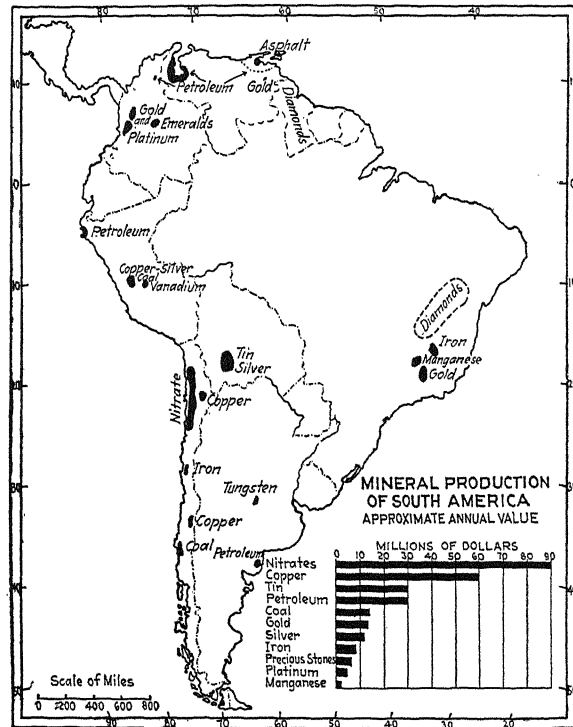


FIG 188.—Principal mineral-producing regions of South America.

and most of the world's supply of diamonds. Today South American production of all these together amounts to only a small sum, say 25 million dollars, which is less than the value of the copper from the single mine at Chuquicamata, Chile. The decline of gold mining is mainly due to two causes: (1) the exhaustion of the richer and more accessible deposits, and (2) the lack of adequate transportation facilities in the Andes,

where most of the gold-bearing veins exist. In short, it costs too much to mine and market the gold. Most of the silver that is mined is obtained in connection with other minerals, especially in connection with the copper of Cerro de Pasco, Peru.

Copper stands next to nitrate in annual value of output and most of it comes from three properties in the Andes; namely, (1) the Cerro de Pasco and associated mines in Peru, (2) the Chuquicamata mine in northern Chile, and (3) the Braden mine south of Santiago, Chile. The total yield of copper in South America is less than one-third that of the United States; yet Chile ranks next to the United States in copper production, and is rising rapidly on account of the low cost of production. The known copper deposits of the Andes are enormous, and it cannot be doubted that other deposits will be found. The cheap copper from South America either will force the closing of many mines in the United States or will force them to find cheaper methods of production.

Virtually all the tin mined in the Americas comes from the lofty plateau of Bolivia. The output is increasing and already constitutes about a quarter of the world's supply.

South America has scarcely more than begun to yield petroleum. In only two countries, Venezuela and northwestern Peru, does the output exceed 5 million barrels a year. A smaller quantity is obtained from Argentina and still less from Colombia and Ecuador, but the entire oil production of the continent was less than 35 million barrels in 1925, while California alone yielded 250 million barrels. There is a belief, however, that the western and northern parts of South America have very large oil reserves yet to be tapped.

The small production of minerals in South America as contrasted with North America and Europe reflects the economically backward condition of the continent. The shortage of capital, of skilled labor, and of transportation, and, to a certain extent, the character of some South American governments retard all forms of development. These conditions are improving and the improvement is shown in the steadily mounting output of minerals. In all of the Andine countries except Ecuador, mining is even now the most important industry so far as export products are concerned. In the case of Bolivia and Chile, minerals constitute about 85 or 90 per cent of the exports of each country. On the contrary, in all of the east-coast countries

mineral exports are of scarcely any consequence at all. Petroleum and a small quantity of tungsten are the only mineral products of Argentina worth mentioning. Uruguay and Paraguay yield practically no minerals, and even in giant Brazil, mining is a very minor industry. The platinum of Colombia also deserves mention. Since the collapse of Russia, an important part of the new platinum of the world has come from Colombia. The production of vanadium in Peru is extremely variable, but these mines have been a main source of this valuable alloy used in making vanadium steel. The diamonds of Brazil and British Guiana and the emeralds of Colombia together reach an annual value of a few million dollars.

It is significant that the little country of Japan yields about the same value of minerals yearly as the whole continent of South America, while still smaller England yields several times as much in coal alone.

CATTLE AND SHEEP RAISING

The greater part of South America has a tropical climate, and tropical lands, of course, are not well suited to the raising of live stock. It will be seen from Figures 102 and 103 that cattle raising is most concentrated in the River Plate lands, and that cattle are next most numerous in the plateau of Brazil. Both these are regions of warm temperate and mild tropical temperatures. In all South America, there are between 80 and 90 million cattle, or about the same number as in North America. Only two South American countries are large exporters of beef, namely, the temperate-zone countries—Argentina and Uruguay—with southern Brazil ranking third. Colombia, Chile, and Venezuela raise considerable numbers of cattle, but they are distinctly inferior in quality to the improved breeds of Argentina and Uruguay. Extensive areas in the Andine countries and in interior Brazil are given over to cattle raising, but hides are practically the only products of these cattle that get into international trade. Dairying as a specialized industry has attained some growth in the Argentine Pampa and in southeastern Brazil—regions of large cities.

As a future source of meat for Europe and other importing lands, South America offers great promise. Argentina is already the largest exporter of beef in the world, exporting, in fact, as much as all other countries combined. The great success of

alfalfa in the Pampa, the mild climate, and the nearness of the cattle lands to the ports are all favorable conditions. Unquestionably, the River Plate lands and southern Brazil can produce beef more cheaply than the United States, and the time is not far off when the United States will import increasingly from those countries.

Sheep are even less well suited to living in the tropics than are cattle. The only tropical country of South America that raises many sheep is Peru, where they are raised at high altitudes in the Andes. In the bleak lands of the far south of Chile and Patagonia, sheep thrive and yield heavy fleeces. This development of sheep raising is largely due to British initiative, as it is in other sections of Patagonia. On the level lands of the Pampa and of Uruguay, sheep still are numerous, but much less so than they were formerly. However, about 70 per cent of all the sheep in South America are in Argentina and Uruguay, and Argentina alone exports 300 to 400 million pounds of wool, which is more than all the rest of the western hemisphere exports. Only Australia sends abroad more than Argentina. Moreover, the exportation of hides and skins from Argentina is three times that from any other country in the world. The United States is a heavy purchaser of wool, hides, and skins from the River Plate lands.

AGRICULTURE

Agriculture and stock raising together constitute the leading occupation of the people of South America. However, less than 4 per cent of the land of the continent is under cultivation. Because of its large size and population, Brazil has the largest area of cultivated land; Argentina has somewhat less, but the two countries together have about 160 million out of a total of 170 million acres of land actually under cultivation in any one year. Colombia, Peru, Chile, and Uruguay are estimated to have under cultivation approximately 2 million acres each, and the remaining countries less than 1 million acres each. These figures can be regarded only as reasonably close approximations.

More than half of the cultivated land is devoted to four crops, corn, coffee, wheat, and alfalfa. Coffee is, of course, the leading agricultural export of the continent, and wheat second. The coffee goes largely from Brazil and the wheat from Argentina. The alfalfa is practically all grown in Argentina and is used for

feeding live stock. Corn is grown in every country, but the only important corn-exporting country is Argentina.

A small fraction of the world's cotton and sugar is grown in South America, mainly in Brazil, Argentina, and Peru. From Brazil, Ecuador, and Venezuela comes nearly one-third of the world's cacao, and Argentina stands as the leading producer and exporter of flax seed. Other agricultural crops of South America are of minor importance in international trade, and are used chiefly for local consumption. The two outstanding agricultural countries are Argentina and Brazil. Brazil is, of course, the dominating country in the world's coffee trade, and Argentina plays an important part in supplying Europe with foodstuffs. Aside from these two countries, South America produces scarcely

UNITED STATES			
Land - 69.5%		Buildings 15.4%	Live Stock 12%
		Implements-3.1%	
BRAZIL			
Land-49.7%		Buildings 11.5%	Live Stock-36.9%
		Implements-1.9%	

FIG. 189.—Agricultural property in Brazil and the United States contrasted.

as much in the form of agricultural foodstuffs as its own people require.

TRANSPORTATION

In only four sections of South America are railways sufficiently numerous to serve the needs of the regions even fairly well. These are (1) the Argentine Pampa, (2) the coffee-growing section of Brazil, (3) Uruguay, and (4) the Central Valley of Chile. To these might be added the nitrate belt of Chile, where the railroads have little traffic except that arising from the nitrate operations and from one large copper camp.

Argentina has the largest mileage and the best system. Most of the lines were built and are operated by British companies.

The railroad mileage of Argentina (nearly 25,000) is over 40 per cent of that of all South America. This railway leadership possessed by Argentina is the outgrowth of the levelness and productivity of the Pampa. Other parts of the country are not well equipped with railways because there is not sufficient traffic to support them. The excellent progress of Argentina is due in no small measure to its network of railroads in its most productive section.

Railway building in Uruguay also has been relatively easy and reasonably remunerative. This little country has more miles of line in proportion to area and population than any other South American country. Most of these roads also were built and are operated by British companies.

In the coffee-growing section of Brazil, a rather complete network of lines, terminating at Santos and Rio de Janeiro,

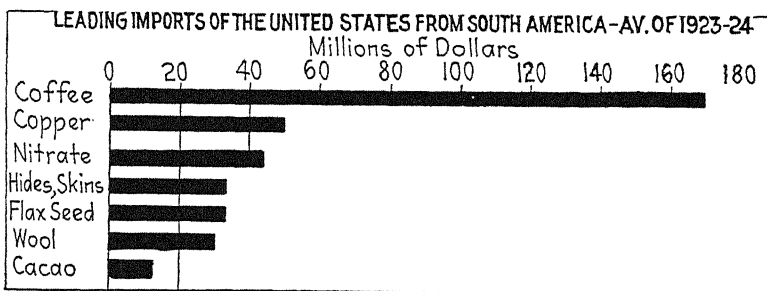


FIG. 190.

has been built. Elsewhere in Brazil, detached lines (with a few feeders) extending to a port are the rule. Some of the lines are corporation owned, some are state owned, and others are government owned. The total mileage of about 20,000 is almost wholly in the states on the eastern side of the country. A few of the lines are excellent, especially the British-owned line from the coffee region of São Paulo to the port of Santos. Many are poorly built and poorly equipped and yield an annual deficit. In proportion to area and population, Brazil has a small railway mileage. This fact is both a cause and a result of the undeveloped condition of the greater part of the country.

The Longitudinal Railway of Chile, extending nearly 1,600 miles from north to south, has many cross-lines reaching to the ports, and these give a larger proportion of the country railway

service than almost any other in South America has. Chile is also well served by steamship lines along the coast.

All of the Andine countries north of Chile have little railway mileage, and very few highways suited to wheeled vehicles. The massive ranges of the Andes make railway building in these countries almost prohibitive in cost. Few of the expensive mountain railways can return any profit on the investment, and most of them must have government assistance. In no other way does the great Andine barrier make itself more felt than in holding back the development of transportation, which in turn holds back all other forms of development.

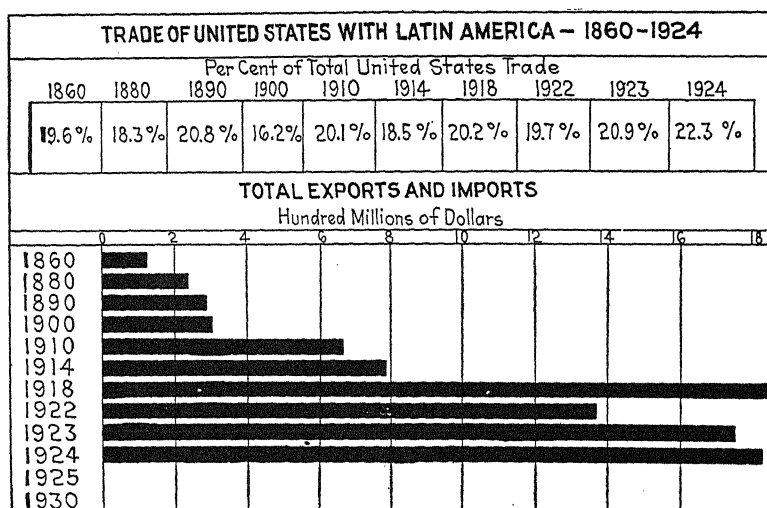


FIG. 191.—The above figures are those of all Latin America, which includes Mexico, Central America, the West Indies, and South America. See also Fig. 193.

In only a few places in all South America are there good highways. One of our smaller states has more miles of modern highways than all South America. Yet the country roads of the United States were poor until recently. Good roads are expensive to build and maintain, and most of South America cannot yet afford them. There are several times as many miles of railway in the continent as there are of good roads. In five countries, Venezuela, Colombia, Ecuador, Peru, and Bolivia, and in parts of several other countries, pack animals do a large part of the carrying not done on rivers or on the sea. Tropical climate, mountainous topography, and insufficiency of capital

are all reasons for the conditions that exist. Many of the bonds issued for railway construction have not turned out well for investors, and the securing of foreign capital for this purpose is not easy.

Rivers are much used in three regions: (1) the Amazon Valley, which has upwards of 25,000 miles of navigable waterways; (2) the River Plate system consisting of the River Plate estuary, the Uruguay, the Paraná and the Paraguay, which forms an outlet for Paraguay and southern Brazil; (3) the Magdalena, which is the chief means of reaching interior Colombia. All of these serve large regions which are either not served at all or are poorly served by railroads; yet the tonnage of traffic which they carry is not great. The Orinoco in Venezuela carries only a small traffic. The rivers are used mainly because there are no better means of transportation, but also because they carry certain heavy products more cheaply than railroads can carry them.

TRADE OF THE UNITED STATES WITH SOUTH AMERICA

The annual foreign trade (exports plus imports) of the ten South American countries is about 3 billion dollars, or \$50 per

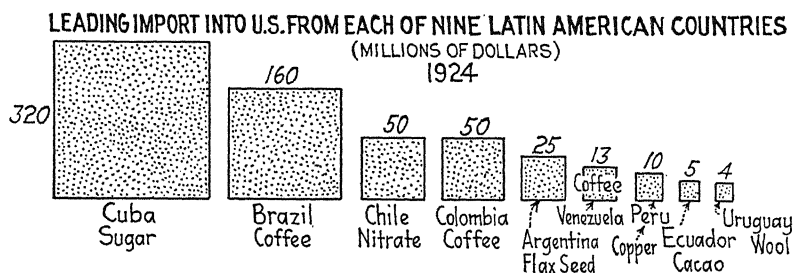


FIG. 192.

capita. This is creditable, but not large. Cuba, for example, has a per capita foreign trade nearly four times as large. About one-fourth of the external commerce of South America is with the United States, which is slightly more than the share of Great Britain in that trade. Comparing our present trade with South America with that of earlier periods, the growth appears gratifying. Exports from the United States to that continent rose from approximately 100 million dollars a year, just before the World War, to 300 million or more since. Our imports from South

America have increased from 200 million dollars to 400 millions or more. This growth is just about the normal rate of increase of our total foreign trade. The growth of our commerce with Canada, Asia, and Africa has been considerably more rapid. In fact, our trade with the 9 or 10 million people of Canada is larger than that with the 60 or 65 millions of South America. The producing power and the purchasing power of half the people of South America is so low that it pulls down the general average of the continent, for the average in the temperate part of South America is high. Half of the foreign commerce of South America is carried on by Argentina.

When one considers the tremendous growth of the foreign trade of Cuba, he is convinced that tropical lands are capable of great development if favorable economic and political conditions can be maintained.

South American exports are almost exclusively products of ranch, plantation, mine, and forest. This is to be expected in

TRADE OF UNITED STATES AND LATIN AMERICA—AVERAGE FOR 1923-24

West Indies \$ 250,000,000	East Coast of South America \$ 185,000,000	Mexico \$ 128,000,000	West Coast of South America \$ 62,000,000	Central America \$ 60,000,000	N. Coast of South America \$ 43,000,000
EXPORTS					
West Indies \$ 396,000,000	East Coast of South America \$ 272,000,000	Mexico \$ 155,000,000	West Coast of South America \$ 127,000,000	North Coast of South America \$ 70,000,000	Central America \$ 37,000,000
IMPORTS					

FIG. 193.

a continent in the stage of development that South America now occupies. The largest single export is coffee, coming mainly from Brazil, but also from Colombia and Venezuela. Of this commodity alone, the United States buys about 200 million dollars' worth a year. The two largest items imported into the United States from the west coast are copper and nitrates, together valued at nearly 100 million dollars a year, with copper in the lead. Wool imported principally from the River Plate

lands frequently exceeds 25 million dollars a year. Every country of South America exports hides and skins. The United States commonly takes 25 to 35 million dollars' worth of these

UNITED STATES EXPORTS TO SOUTH AMERICA-FOUR YEAR AVERAGE VALUE-1920-23

Finished Manufactures—\$245,000,000	Semi-Manufactured Products \$ 52,000,000	Manufactured Foodstuffs—\$22,000,000	Crude Materials \$ 17,000,000	Crude Foodstuffs—\$7,000,000
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FIG. 194.

annually, the largest part coming from Argentina. Flax seed, sent from Argentina to the United States, reaches 30 to 40

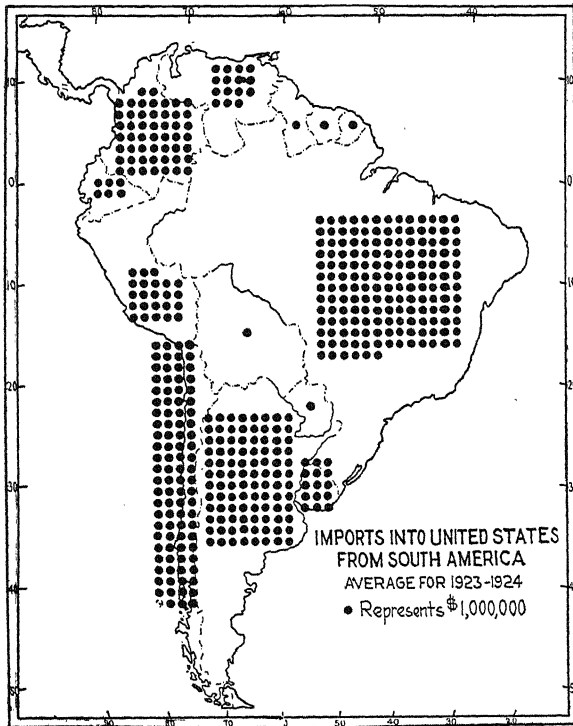


FIG. 195.

million dollars a year. Cacao from Brazil, Ecuador, and Venezuela exceeds 10 million dollars. Rubber from the Amazon Valley, once a leading import into the United States, declined

to 5 or 10 million dollars a year, but increased during the higher prices that prevailed in 1924-1925. The large exports of cereals and meats go mainly to Europe.

The location of South America, largely in the tropics, and of the United States in the intermediate zone, would be expected to stimulate a very large exchange of products. Of our four leading imports, three are tropical products, cane sugar, coffee, and rubber. Our chief source of cane sugar is Cuba; our chief source

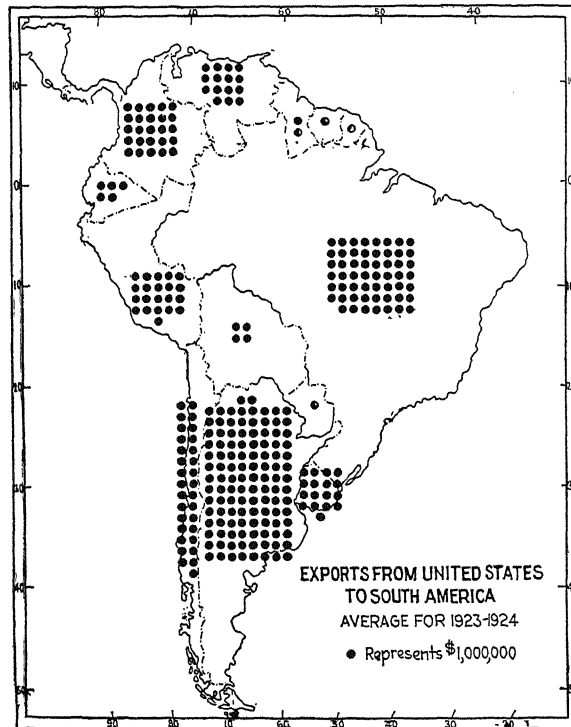


FIG. 196.

of rubber is southeastern Asia. Of the three leaders, only coffee comes from South America. Our bananas come mostly from Central America and Jamaica. The largest source of cacao is west Africa, although large quantities also come from South America. All of these products are grown in South America; yet, for one reason or another, we depend mainly upon that continent for only one of the five. The United States buys much more from South American countries than it sells to them.

Many years ago Great Britain, and, in a lesser degree Germany and France, supplied South America with most of its needed manufactures. The United States has only recently been a serious competitor for this trade. European exporters had developed the trade and could usually undersell American exporters. The United States, however, has built up an active trade in certain articles which Europe is not well prepared to supply, such as lumber and timber, petroleum products, agricultural and mining machinery, and more recently, automobiles. American automobiles almost monopolize the South American markets. Our enormous production for home demand enables us to manufacture automobiles more cheaply than any other country. Railway materials and special machinery are exported from the United States to South America in increasing quantities; but our sales of textiles, hardware, and general merchandise are not large. These still come mainly from Europe and especially from Great Britain and Germany. There is some doubt as to the ability of the United States to meet European competition in this field of general manufactures.

About 60 per cent of our trade with South America is with the three east-coast countries, Brazil, Argentina, and Uruguay; about 25 per cent is with the west-coast countries, and 15 per cent with the north coast (including Colombia). Ordinarily the balance of trade is against the United States in every South American country with the exception of Bolivia.

INFLUENCE OF THE PANAMA CANAL

The opening of the Panama Canal in 1914 has had a favorable effect upon the commerce between the United States and the west coast of South America. The effect, however, does not show itself in any great increase in the actual volume of goods sold to the west coast, although the percentage of increase is considerable. It is to be remembered that the total population of the west-coast countries (omitting Colombia) is only about 15 million, the majority of whom earn very low wages and hence have very low purchasing power. So far as the consumption of goods from the United States is concerned, fully 10 million of these people may almost be dropped from consideration. The opening of the Canal greatly increases the ease with which United States exporters can send goods to the west coast of South America. It does not, however, have very much effect

upon the buying power of these 10 million or more Indian and mestizo people who live in the mountains and on the high plateaus.

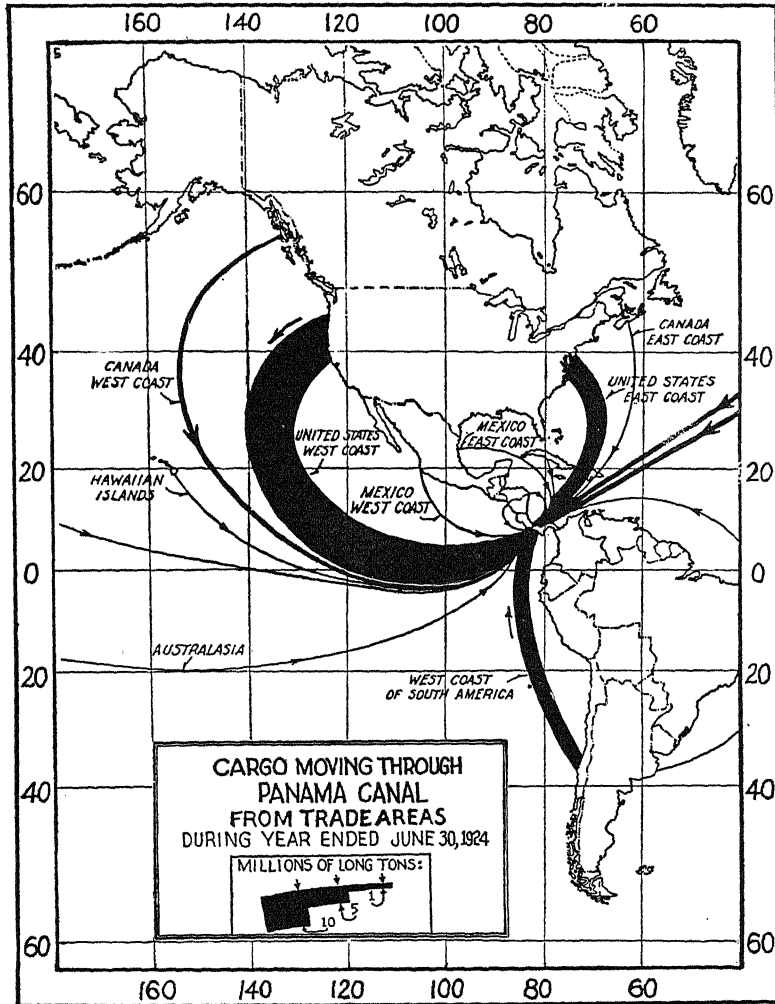


FIG. 197.—Traffic through the Canal from 1914-15 to 1923-24 increased $5\frac{1}{2}$ times. Cargoes from the west coast of the United States to the east coast form much the largest traffic movement. (U. S. Dept. of Com.)

The Canal is performing a valuable service, however, in making possible direct and frequent steamship service between the eastern United States and the west coast of South America.

The excellent steamship service through the Canal is attracting an ever-increasing stream of tourists, educators, business men, and others, whose visits to South America are doing much to inform North Americans and to correct misapprehensions and misunderstandings. While trade between the United States and the west coast increased 160 per cent in value during the first ten years following the opening of the Canal, this represents a total increase of only 120 million dollars in a total increase of our foreign trade during that period amounting to more than 4 billion dollars.

The Canal has greatly facilitated the shipment of three mineral products from the west coast to the eastern United States, namely, nitrate, copper, and iron ore. The greater part of these come from Chile, and our total importations from Chile increased 300 per cent in value during the decade following the opening of the Canal. The value of our exports to Ecuador and Peru nearly doubled during this decade. This is a little below the ratio of the growth of our foreign trade in general. The direct effect of the Canal upon our commerce with the west coast may be expressed thus: The Canal has permitted a normal growth in our trade with western South America. This normal growth would not have been possible if the barrier at Panama had not been cut through.

It is probable that our increased intercourse with the west coast will lead to the increased investment of United States capital, and to a steadily growing interest on our part in the development and stability of these republics.

IMPROVING THE RELATIONS BETWEEN THE UNITED STATES AND SOUTH AMERICA

In the past the relations of South American countries with several countries of Europe were closer than those with the United States. Culturally, France has occupied first place in the minds of South Americans. Commercially and financially, Great Britain has stood closest, for British capital has done more to develop these countries than that of any other nation. Until quite recently the United States devoted its capital and energy to developing its own resources and its own internal commerce. Only since the opening of the present century has the United States entered vigorously upon a policy of financial and commercial expansion. The acquisition of territory in the Caribbean

region in 1898, the development of close relations with Cuba, the building of the Panama Canal, the establishment of United States banks in Latin America, the accumulation of large sums of money for investment, the severe setback that European countries received from the World War, and the great improvement of steamship service to both coasts of South America, have all favored the expansion of American interests in the southern continent.

Partly due to advantages which the World War gave to us, our trade with South America now exceeds that of any European country. But that increase has not been purely accidental. It is due also to more intelligent and more energetic efforts. Our departments of Commerce and of State have sent to South American countries well-trained, high-type men as commercial attachés, consuls, trade commissioners, and special financial investigators. No European nation has found itself able to send so many men to study South American conditions and report upon them so thoroughly as the United States has done. The publications included in our *Consular Reports*, *Special Agents' Series*, *Trade Promotion Series*, *Tariff Series*, *Trade Information Bulletins*, and others, make available to exporters and to the American people at large a vast body of information. The fine type of men now being sent to South America to fill responsible official positions and to represent leading business houses promises well for the future. The strong place held by the British in South American business affairs is due in no small degree to the substantial and able men who represent British interests abroad.

Complaints of defective packing, unduly short credits, failure to send the exact goods ordered, and other shortcomings of United States exporters have greatly decreased. If the prices and quality of goods offered by American firms are as favorable as those offered by other firms, they get their share of the orders. One important difficulty is that of selling American-made goods as cheaply as European-made goods can be sold.

Tens of thousands of American visitors are now going to South America yearly, and large numbers of South American students are attending schools and universities in the United States. Increasingly, these universities are establishing courses that deal with South American political and social institutions, history, and geography. In recent years there has been a tremendous

increase in the study of Spanish in the United States. All of these influences are helping to clear away past misunderstandings on both sides, and a genuinely cordial feeling is growing up. However, the Latin American is more sensitive and temperamental than the Anglo-American. He is prompt to resent any assumption of superiority on the part of the North American; he resents any air of condescension, objects to haste or high pressure business methods, and attaches much weight to good manners, to fastidious dress, and to the social graces generally.

Many American firms have found the South American market unprofitable, because the cost of doing business exceeded the profits. This must often be true where orders are small. Unless the value of sales is considerable, or unless the selling costs are largely assumed by local selling agencies, there is little profit in most South American business. But when the astonishing commerce that the United States has built up in the Caribbean region, especially in Cuba and Porto Rico, is considered, there is reason for believing that something similar may be accomplished in other parts of Latin America. If one-half of the population of South America were to purchase as many American products per capita as the Cubans buy, our commerce with South America would be over 5 billion dollars a year.

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STATISTICAL TABLES

TABLE 1.—AREA, POPULATION, AND RAILWAYS OF SOUTH AMERICA

	Area* in thous- ands of square miles	Population 1922 or * latest avail- able date	Popula- tion,* to square mile	Approxi- mate† railroad mileage, 1925
Argentina.....	1,136	8,699,000	7.66	25,000
Bolivia.....	614	2,890,000	4.71	1,600
Brazil.....	3,145	30,636,000	9.74	20,000
Chile.....	290	3,819,000	13.18	6,000
Colombia.....	435	6,300,000	14.47	1,100
Ecuador.....	119	2,000,000	16.86	450
Guiana colonies:
British.....	89	300,000	3.3	100
Dutch.....	54	129,000	2.5	
French.....	32	44,000	1.4	
Paraguay.....	98	1,000,000	10.23	320
Peru.....	534	5,700,000‡	13.67	2,100
Uruguay.....	72	1,529,000	21.19	1,700
Venezuela.....	394	2,412,000	6.12	700
Total.....	7,012	65,458,000	9.3	59,070

* From *U. S. Statistical Abstract*, 1923.

† Compiled.

‡ *U. S. Statistical Abstract* gives 7,300,000.

TABLE 2.—FOREIGN TRADE OF THE UNITED STATES BY CONTINENTS,
1875 TO 1924 (*U. S. Dept. of Commerce*)
Beginning with 1915, figures are for calendar years, previously for years
ending June 30

(Values in millions of dollars)

Yearly average	Total value	North America		South America		Europe		Asia and Oceania		Africa	
		Value	Per cent	Value	Per cent	Value	Per cent	Value	Per cent	Value	Per cent
Exports:											
1875-1879.....	703	79	11.3	24	3.3	569	81.0	26	3.8	4	0.6
1880-1884.....	811	86	10.6	27	3.4	666	82.1	26	3.2	5	0.6
1885-1889.....	715	78	11.0	30	4.2	569	79.5	34	4.8	4	0.5
1890-1894.....	902	107	11.9	34	3.8	721	79.9	35	3.9	5	0.5
1895-1899.....	1,040	130	12.5	35	3.3	805	77.4	56	5.4	15	1.4
1900-1904.....	1,429	208	14.5	43	3.0	1,054	73.8	96	6.7	28	2.0
1905-1909.....	1,733	311	17.9	75	4.3	1,190	68.6	140	8.1	18	1.1
1910-1914.....	2,166	501	23.1	121	5.6	1,350	62.3	169	7.8	25	1.2
1915-1920.....	6,261	1,216	19.4	341	5.4	3,993	63.8	634	10.1	78	1.2
1921-1924.....	4,269	1,055	24.7	271	6.3	2,246	52.6	631	14.8	65	1.5
Imports:											
1875-1879.....	491	123	25.1	67	13.7	243	49.4	49	9.9	9	1.9
1880-1884.....	685	141	20.6	79	11.6	378	55.1	76	11.1	11	1.7
1885-1889.....	675	133	19.7	77	11.5	375	55.6	84	12.5	5	0.7
1890-1894.....	797	167	21.0	112	14.1	412	51.7	100	12.5	5	0.7
1895-1899.....	718	114	15.9	101	14.0	379	52.8	115	16.0	9	1.2
1900-1904.....	919	163	17.7	110	12.0	478	52.1	156	17.0	11	1.2
1905-1909.....	1,257	244	19.4	148	11.8	637	50.7	213	17.0	15	1.2
1910-1914.....	1,689	347	20.6	207	12.2	836	49.5	276	16.3	23	1.3
1915-1920.....	3,223	972	30.2	568	17.6	671	20.8	925	28.7	86	2.7
1921-1924.....	3,256	893	27.4	397	12.2	1,002	30.8	897	27.5	66	2.0

TABLE 3.—TRADE OF THE UNITED STATES WITH SOUTH AMERICA 1850-1924*

Year	Imports from South America		Exports to South America	
	In thousands of dollars	Per cent of total U. S. imports	In thousands of dollars	Per cent of total U. S. exports
1850-1854.....	21,435	9.1	10,778	5.0
1855-1859.....	32,964	10.6	14,939	4.5
1860-1864.....	29,322	9.9	15,683	5.1
1865-1869.....	34,817	9.1	20,297	4.4
1870-1874.....	57,912	10.0	24,933	4.0
1875-1879.....	67,236	13.7	23,533	3.3
1880-1884.....	79,307	11.6	27,304	3.4
1885-1889.....	77,484	11.5	29,842	4.2
1890-1894.....	112,365	14.1	34,292	3.8
1895-1899.....	101,413	14.0	34,615	3.3
1900-1904.....	110,322	12.0	42,657	3.0
1905-1909.....	148,052	11.8	74,871	4.3
1910-1914.....	206,858	12.2	121,028	5.6
1915-1919.....	490,042	18.3	259,057	4.7
1905.....	150,796	13.5	56,894	3.8
1906.....	140,423	11.5	75,160	4.3
1907.....	160,166	11.2	82,157	4.4
1908.....	124,999	10.5	83,584	4.5
1909.....	163,879	12.5	76,562	4.6
1910.....	196,165	12.6	93,247	5.3
1911.....	182,624	12.0	108,895	5.3
1912.....	215,089	13.0	132,310	6.0
1913.....	217,735	12.0	146,148	6.0
1914.....	222,677	11.8	124,540	5.3
1915.....	261,490	15.6	99,324	3.6
1916.....	391,562	17.8	180,175	4.2
1917.....	542,213	20.3	259,480	4.1
1918.....	567,418	19.3	314,559	5.3
1919.....	687,525	17.5	441,748	5.6
1920.....	760,999	14.4	623,917	7.6
1921.....	295,623	11.8	273,325	6.1
1922.....	358,763	11.5	226,075	5.9
1923.....	467,421	12.3	269,318	6.4
1924.....	466,500	12.9	315,100	6.9

*U. S. Dept. Commerce.

TABLE 4.—TRADE OF THE UNITED STATES WITH LATIN AMERICA
(Values in millions and tenths of millions of dollars, *i.e.*, 00,000 omitted)

Region and country	Exports				Imports			
	1910-1914	1922	1923	1924	1910-1914	1922	1923	1924
Latin America, total ¹	302.2	558.3	695.0	771.2	435.5	814.7	1,050.6	1,059.6
Southern North America.....	181.2	332.2	425.7	456.2	228.6	455.9	583.2	593.1
Mexico.....	53.1	109.9	120.2	135.1	70.5	132.1	140.1	167.1
Central America, total.....	37.6	44.8	56.2	64.8	17.4	31.3	37.3	37.3
British Honduras.....	1.5	1.8	1.8	1.8	1.4	2.2	2.2	2.2
Costa Rica.....	3.4	4.0	4.8	6.0	3.8	5.5	4.6	4.7
Guatemala.....	2.8	5.5	6.3	8.8	2.8	8.8	11.3	10.1
Honduras.....	2.8	10.0	11.3	9.1	2.8	5.2	4.9	6.0
Nicaragua.....	2.4	4.1	5.0	6.3	1.4	3.2	5.4	5.5
Panama.....	22.5	14.5	21.8	26.4	3.8	3.6	4.3	5.0
Salvador.....	2.1	4.9	5.2	6.5	1.3	2.6	4.5	3.9
West Indies and Bermuda, total..	90.5	177.5	249.3	256.3	140.8	292.7	405.7	388.8
Bermuda.....	1.4	3.3	4.0	3.5	0.6	1.0	1.1	1.2
Jamaica.....	25.0	8.2	8.8	7.3	26.1	7.3	6.6	6.2
Trinidad and Tobago.....	23.3	4.9	4.4	3.8	25.5	4.5	5.2	4.9
Other British.....	24.4	7.5	7.4	6.8	21.7	2.4	2.3	3.1
Cuba.....	63.0	127.9	192.4	199.8	122.1	267.8	376.4	361.7
Dominican Republic.....	4.4	10.2	13.4	15.6	3.6	4.8	8.4	5.8
Dutch West Indies.....	0.9	2.2	2.7	3.7	0.5	2.8	3.6	4.1
French West Indies.....	1.6	2.6	2.5	2.5	0.1	0.1	0.1	0.2
Haiti.....	5.9	9.1	12.0	11.6	0.8	1.2	1.7	1.2
Virgin Islands of United States	0.9	1.6	1.6	1.7	0.2	0.7	0.4	0.4
South America, total.....	121.0	226.1	269.3	315.1	206.9	358.8	467.4	466.5
Caribbean, total.....	13.1	31.9	37.1	48.9	22.5	51.3	60.6	75.9
Colombia.....	5.8	20.1	22.3	28.7	11.9	36.1	45.7	57.7
Guiana:								
British.....	1.8	1.9	1.7	1.6	0.5	0.3	0.8	0.9
Dutch.....	0.7	0.8	0.8	0.8	0.9	0.7	0.8	0.6
French.....	0.3	0.4	0.4	0.2	(*)	0.3	0.2	0.2
Venezuela.....	4.5	8.7	11.9	17.6	9.1	13.9	13.1	16.5
East coast, total.....	84.7	150.6	174.0	201.3	148.3	223.6	282.1	262.2
Argentina.....	47.2	95.5	112.8	117.0	32.9	85.7	115.3	75.3
Brazil.....	31.5	43.2	45.6	65.2	110.9	120.4	143.2	179.3
Paraguay.....	0.1	0.4	0.6	0.8	(*)	1.1	0.5	0.1
Uruguay.....	5.9	11.4	15.1	18.2	4.5	16.5	21.8	7.1
West coast, total.....	23.2	43.5	58.2	64.9	36.0	83.8	124.7	128.4
Bolivia.....	0.9	2.6	3.0	4.1	(*)	0.7	2.4	0.1
Chile.....	13.9	22.5	31.1	31.4	22.9	59.7	91.8	98.7
Ecuador.....	2.4	4.4	4.3	5.5	3.4	7.5	6.1	6.7
Peru.....	6.0	14.0	19.8	23.8	9.8	15.9	24.4	22.9
Porto Rico.....	33.2	58.0	76.9	78.4	36.9	60.1	80.3	77.3

¹ Does not include shipments to or from Porto Rico.² Four year average, 1911-1915.³ Less than \$50,000.

TABLE 5.—FOREIGN TRADE OF SOUTH AMERICA
Compiled by the Pan-American Union and published in its *Bulletin* of February, 1925.
(IMPORTS FROM LEADING COMMERCIAL COUNTRIES)

Countries	Total from all countries		United Kingdom		France		Germany		United States	
	1922	1923	1922	1923	1922	1923	1922	1923	1922	1923
Argentina.....	668,956,107	842,377,193	156,827,033	200,443,791	134,010,853	56,745,386	89,929,775	114,675,552	148,019,322	175,974,133
Bolivia.....	20,705,930	21,679,907	4,231,787	41,600,000	481,397	1,600,000	1,091,020	11,200,000	4,653,438	14,900,000
Brazil.....	214,841,900	230,796,786	55,524,300	61,142,505	12,735,710	14,882,756	19,140,810	24,061,753	49,280,510	51,485,877
Chile.....	86,571,275	120,198,389	20,812,139	28,835,000	4,333,130	6,594,455	12,079,429	16,057,445	28,194,885	32,058,680
Colombia.....	42,978,101	56,417,425	10,000,000	12,000,000	180,000	1,500,000	12,800,000	18,500,000	25,500,000	25,500,000
Ecuador.....	16,243,499	19,563,999	4,637,837	5,800,000	641,953	1,900,000	1,207,552	1,600,000	7,475,042	19,000,000
Paraguay.....	5,514,245	8,314,084	1,308,108	1,899,609	87,935	154,554	379,848	479,012	1,184,536	1,305,897
Peru.....	51,479,812	63,647,828	9,475,039	13,003,853	1,571,695	1,577,318	5,870,367	6,832,484	20,475,039	26,261,564
Uruguay.....	86,049,786	108,700,000	16,499,346	25,000,000	2,906,024	25,000,000	8,816,590	11,000,000	18,129,226	222,500,000
Venezuela.....	19,457,558	225,000,000	4,521,815	46,000,000	1,142,315	1,500,000	1,090,491	23,000,000	10,296,658	212,000,000
Total.....	1,211,798,213	1,496,695,611	283,837,414	358,724,758	58,771,014	89,454,469	142,105,882	182,806,246	301,188,711	360,986,151
Per cent.....	100.00	100.00	23.42	23.96	4.84	5.97	11.72	12.21	24.58	24.11

(EXPORTS TO LEADING COMMERCIAL COUNTRIES)

Countries	Total to all countries		United Kingdom		France		Germany		United States	
	1922	1923	1922	1923	1922	1923	1922	1923	1922	1923
Argentina.....	655,728,040	748,220,424	145,756,550	183,247,824	38,395,864	55,457,269	51,262,090	61,764,837	77,395,337	87,122,965
Bolivia.....	38,960,129	42,000,606	19,292,574	21,800,000	927,071	11,300,000	152,281	1,200,000	14,869,435	117,000,000
Brazil.....	308,170,920	335,636,959	29,953,950	23,345,794	33,474,870	41,708,274	18,306,730	18,987,023	117,648,700	188,804,809
Chile.....	123,584,270	196,081,677	14,245,154	56,579,380	4,296,770	8,047,885	7,994,212	8,963,305	43,962,960	90,119,230
Colombia.....	52,390,198	63,880,765	1,000,000	12,200,000	1,000,000	11,000,000	1,800,000	11,300,000	87,556,540	146,500,000
Ecuador.....	22,407,960	22,709,611	1,457,457	11,800,000	1,893,303	12,300,000	2,774,086	11,600,000	8,771,242	110,000,000
Paraguay.....	9,599,007	12,097,409	3,042	56,359	75,865	194,768	3,599	7,865	1,564,651	1,503,310
Peru.....	90,847,348	114,954,090	32,037,465	37,776,182	944,031	296,868	1,902,525	3,357,704	81,991,980	45,972,815
Uruguay.....	80,605,132	104,849,691	25,866,335	29,730,617	6,248,948	13,095,713	10,512,030	15,424,179	16,451,238	17,955,692
Venezuela.....	26,603,960	425,000,000	1,806,439	25,000,000	3,475,923	23,000,000	1,217,025	22,500,000	8,310,532	211,500,000
Total.....	1,401,896,964	1,672,431,232	271,418,966	358,536,156	90,432,645	127,400,777	94,924,578	114,104,993	358,522,615	465,488,821
Per cent.....	100.00	100.00	19.36	21.41	6.45	7.59	6.77	6.81	25.57	27.81

¹ Estimate.

² Estimate in part.

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